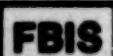


JPRS-TND-85-014

21 August 1985

Worldwide Report

**NUCLEAR DEVELOPMENT
AND
PROLIFERATION**



FOREIGN BROADCAST INFORMATION SERVICE

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21 August 1985

**WORLDWIDE REPORT
NUCLEAR DEVELOPMENT AND PROLIFERATION**

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HONG KONG

AGREEMENT TO FINANCE NUCLEAR POWER PLANT SIGNED

Hong Kong HONGKONG STANDARD in English 13 Jun 85 pp 1, 14

[Text]

THE Hongkong Nuclear Investment Company Limited (HKNIC) signed an agreement yesterday for the issue of bills of exchange by tender worth \$500 million.

The money raised under the facility will be used to provide the greater part of HKNIC's equity investment in the joint venture company for building the Daya Bay nuclear power plant.

The issue is guaranteed by the Hongkong government, arranged by Schroders Asia Ltd and fully underwritten by the Hongkong and Shanghai Banking Corporation, Standard Chartered Bank and Schroders Asia Limited.

The remaining \$300 million, which makes the total equity of \$800 million (US\$100 million), will be provided by China Light and Power Company as the holding company.

Following the signing ceremony the chairman of the HKNIC, Mr William Stones, said: "With the government's guarantee and the granting by the Financial Secretary of Specified Liquid Asset status, the bills drawn under the facility will be unique in Hongkong."

The commercial loans will mature in 1991 and there is no pre-set interest rate.

However, there will be a maximum margin over the Hongkong inter-bank rate, but the actual rate will be subject to the tenders, Mr Stones said.

The tender panel comprises BA Asia Ltd, BT Asia Ltd, Banque Indosuez, Barclays Bank PLC, Chase Manhattan Asia Ltd, Citicorp International Ltd, Jardine Fleming and Co Ltd, Grindlays Asia Ltd, Lloyds Bank International Ltd, Manufacturers Hanover Asia Ltd, Paribas Asia Ltd, Sanwa International Finance Ltd, Schroders Asia Ltd, Standard Chartered Asia Ltd and Wardley Ltd.

Meanwhile, Mr Stones said negotiations on the contract with the French nuclear manufacturer, Framatome, and Britain's General Electric Company to construct a 1,800 megawatt nuclear plant will start between June 20 and 25.

Negotiations will also take place at that time with another party, Electricite de France, which will be responsible for the civil project services.

Mr Stones said a lot of work had been done on studying the technical aspects and the forthcoming negotiations will centre on commercial matters.

Mr Stones said he hoped to sign a letter of intent, at the right price, with these companies by the end of August. It will then go to the board for authorisation so that work can proceed before the end of this year.

This schedule aims to have the first 900-megawatt reactor turbine running by the end of 1991.

Asked what would happen if a fair price cannot be negotiated with these companies, Mr Stones said: "Supposing in the end we really find ourselves in a situation where we could not negotiate a price which we want, which we believe to be a fair price not just from our point of view but also from theirs, there's no point getting a price that is unfair to them or, in fact, to us."

But Mr Stones stressed that the time schedule and time element were important factors in this kind of massive project.

He added that expertise would be given by a consulting firm — Electricite de France — a utility company in France which has already got about 39 nuclear reactors in service with another 15 to 20 under construction.

Mr Stones said the regulatory system set up in China was similar to that in France.

CSO: 5150/0035

JAPAN

AGREEMENT REACHED WITH PRC ON NUCLEAR POWER COOPERATION

OW050955 Tokyo KYODO in English 0945 GMT 5 Jul 85

[Text] Beijing, July 5 KYODO — Japan and China reached a provisional agreement here Friday on nuclear power cooperation, opening the way for Japan's export of atomic power plant equipment to its communist neighbor.

Details of the agreement, a product of bilateral negotiations opened in October 1983, were not released pending official signing of the accord, probably at a bilateral ministerial meeting set for Tokyo later this month. But chief Japanese negotiator Yoshifumi Matsuda, director general of the Foreign Ministry's Office of Science and Technology Affairs, said the agreement includes provisions ensuring peaceful use of nuclear power and the related technology to be exported from Japan.

China had objected to a proposed provision allowing Japan to call for the return of equipment and radioactive materials in the event of a serious violation of the agreement on the Chinese side.

Speaking to reporters, Matsuda said both Japan and China had made concessions to reach agreement on the content of the provision. He did not elaborate. He said China has so far concluded similar agreements with Italy, France, West Germany, Brazil, Argentina, Belgium and Britain. But only the agreements with Brazil and Argentina contain provisions concerning peaceful use of nuclear power and radioactive materials, Matsuda added. He said Japanese negotiators won Chinese agreement on the provision after telling the Chinese officials that Japanese people are very sensitive about the issue because of the 1945 atom bomb holocaust in Hiroshima and Nagasaki.

China was represented in the five-day negotiations by Jia Weiwen, a member of the State Scientific and Technological Commission. China plans to build about 20 nuclear power plants with combined output of 10 million kilowatts through the year 2000, starting with one at Qinshan, central China.

CSO: 5160/4

JAPAN

RESEARCH COMMENCES ON HIGH-CONVERSION NUCLEAR REACTOR

OW171317 Tokyo KYODO in English 1149 GMT 17 Jul 85

[Text] Tokyo, July 17 KYODO -- Japan has started research on a light water reactor that will be able to produce about the same amount of nuclear fuel as it has used, it was revealed Wednesday. The governmental Japan Atomic Energy Research Institute said it hopes to complete research and development on the reactor by about 1995 so that it can be put to practical use by about 2000. The new reactor is called a high-conversion light water reactor (HCLWR).

According to the institute, there has been such a great delay in the development of a fast breeder reactor that the chances of it being put to use in the near future are slim. Kansai Electric Power Co., which is Japan's main user of the pressurized water reactor (PWR), on which research is being based, and Mitsubishi Heavy Industries Ltd., builder of the PWR, are showing strong interest in the HCLWR research. The two companies also intend to work to develop their own new reactor -- a high-conversion PWR -- while seeking the cooperation of the institute.

The Science and Technology Agency, recognizing importance of the HCLWR, secured a 40 million yen budget for the project for fiscal 1985 and intends to seek a 370 million appropriation for fiscal 1986. The institute said that the HCLWR increases the density of fuel-rod placement in light water reactors, now in wide use in Japan, in order to reduce the amount of water running between fuel rods, and cuts the ratio of neutrons -- jumping out in nuclear fission -- absorbed by water so that uranium 238, which is nonfissionable, will absorb much more neutrons and thus be converted into plutonium 239, which is quite fissile. The speed of neutrons in the projected reactor will be much greater than that of a common light water reactor, researchers said.

CSO: 5160/9

JAPAN

BRIEFS

NUCLEAR FUSION DATA LINK WITH U.S.--Tokyo, June 5 KYODO--Leading nuclear fusion research organizations from Japan and the U.S. plan to develop a package of codes capable of analyzing and evaluating each other's data using their own supercomputers. The plan, aimed at promoting bilateral cooperation in the scientific field, is planned for completion within a year. The Plasma Institute at Nagoya University, central Japan, will launch a test of software for file transfers from July 1 following over five years of tests on programming instructions, Hideo Ikegami, a professor at the institute said Wednesday. The institute's partner in the project is the Lawrence Rivermore National Laboratory in California, which provides a nationwide data exchange network, called the Magnetic Fusion Energy Network (MFENET), connecting five major U.S. governmental institutes via a Cray-1 supercomputer, Ikegami said. Meanwhile, the Japanese institute has installed Fujitsu Ltd's VP-100 supercomputer, which connects terminals at the country's nuclear energy research centers, he said. "The computer codes to be developed, will enable U.S. and Japanese researchers to check each other's study results faster," the professor said.
[Text] [Tokyo KYODO in English 0338 GMT 5 Jun 85]

PRC NUCLEAR PROJECT BIDS--Hong Kong, 21 Jun (KYODO)--Three Japanese construction companies--Taisei Corp., Maeda Construction Co. and Shimizu Construction Co.--have been made specified tenderers for a nuclear power plant project in the Shenzhen Special Zone, Guangdong Province, China, reliable informed sources here disclosed Friday. The Japanese construction companies, which are members of consortium with French and Chinese firms, are on a list of six consortiums invited to bid for the project, worth about 30 billion Hong Kong dollars, the sources said. The nuclear power plant will have two reactors with a total capacity of 1.8 million kilowatts located along Dayan Wan, Shenzhen City. Tenders will be submitted on 30 August, they said. [Text] [Tokyo KYODO in English 0304 GMT 21 Jun 85 GW]

CSO: 5160/6

PEOPLE'S REPUBLIC OF CHINA

WEN WEI PO URGES SINO-U.S. NUCLEAR COOPERATION

HK300544 Hong Kong WEN WEI PO in Chinese 30 Jun 85 p 2

[Editorial: "Eliminate the Obstacles to Sino-U.S. Nuclear Energy Cooperation"]

[Text] On the eve of President Li Xiannian's visit to the United States, the United States sent a 6-person delegation headed by Richard Kennedy, ambassador-at-large, to Beijing to discuss the issue of nuclear energy cooperation. According to U.S. officials, great progress was made in the talks. However, China's XINHUA NEWS AGENCY merely said that they held "profitable talks."

News from Washington says: The United States and China may formally sign an agreement on nuclear energy cooperation when Li Xiannian visits the United States in July.

It is known to all that the United States is the one to be blamed for the delay in the formal signing of the nuclear energy cooperation agreement. In late April, 1984, when President Reagan visited China, he initiated the agreement on nuclear energy cooperation. However, the United States kept procrastinating on the presentation of the agreement to Congress for examination and approval. On 16 April this year, that means 14 months after Reagan's visit, the U.S. House of Representatives approved the amendment to the "export control regulations," thus making the examination and approval of the agreement on nuclear energy cooperation even more complicated and harsh. The new amendment empowers Congress to veto nuclear energy cooperation. In addition, it prolongs the examination time from 60 days to 90 days and makes hearings a must. According to the old regulations, Congress would have almost no other alternative but to approve the Sino-U.S. nuclear energy cooperation agreement which was presented to Congress for approval by the White House.

On the issue of transfer of advanced technology to China, because of the pressure put on the Coordinating Committee for Export Control by the United States, the latter has lifted its restrictions on the export of microcomputers to China. However, it has extended the embargo to the export of superconducting materials, robots, gas turbine technology, and computer software. This policy is in fact protectionism in the area of technology transfer.

This policy is not in the interest of U.S. development of its foreign trade. U.S. financial groups react to this differently. U.S. nuclear industry is experiencing a crisis of a rapidly shrinking market. In the next 10 years, if the United States can expand its nuclear energy market in China, its nuclear energy industry will be able to receive orders valued at about \$10 billion and to increase the number of its employees

by 20,000 to 50,000. Thus, the industry hopes the White House will sign the Sino-U.S. agreement on nuclear energy cooperation as soon as possible. Ambassador Kennedy's visit to China indicates that in the United States, people are increasingly urging the signing of the agreement on nuclear energy cooperation.

Some congressmen are of the opinion that it is necessary to ask China to provide a written guarantee for U.S. supervision and control in order to prevent the transfer of nuclear technology to other countries. China is a member of IAEA and has consented to supervision. On many occasions, various Chinese leaders have openly announced that "China does not favor nuclear proliferation; it does not, and will not, help any non-nuclear country develop nuclear weapons."

Without the help of foreign nuclear technologies, China produced A-bombs long ago. China could have proliferated military nuclear technology long ago. However, so far China has not transferred its nuclear weapons or technology to other countries. China advocates world peace and nuclear disarmament. That is its firm principle. If one has doubts as to whether or not China will proliferate nuclear technology, one is blind to the fact. In the United States, there are many far-sighted people.

They can, by staying away from protectionism, facilitate the development of Sino-U.S. relations. The United States should discard some outmoded political prejudices and eliminate obstacles to the transfer of technology. China and the United States are at different stages of technological and industrial development. Cooperation can only benefit the U.S. economy and world peace.

CSO: 5100/4134

PEOPLE'S REPUBLIC OF CHINA

CONTRACT READIED TO MONITOR DAYA BAY PROJECT

HK240419 Hong Kong SOUTH CHINA MORNING POST in English 24 Jun 85 p 19

[Text] A \$2 million contract to monitor the Daya Bay nuclear power plant is expected to be signed with a British consultancy early next month.

It is understood the Economic Service Branch is drafting an agreement which will be completed within the next week or so, and which will then be forwarded to the United Kingdom Atomic Energy Authority for comments before the signing.

The contract, which includes five elements, will be completed by July 1987 and will involve periodic reports.

These will include advice on the plant's radioactive monitoring programme, accident assessment, contingency plans and publicity matter.

In addition, about five officials from the Royal Observatory and the Medical and Health Department will be trained in the UK in such matters as radioactivity protection and practical laboratory experience.

CSO: 5100/4134

PEOPLE'S REPUBLIC OF CHINA

BRIEFS

PRC-JAPAN NUCLEAR ENERGY ACCORD--Beijing, 5 Jul (XINHUA)--China and Japan initialled an agreement on cooperation in peaceful use of nuclear energy here today. The signatories to the document where Jia Weiwen, leader of the Chinese delegation to the talks on the agreement, and Hirofumi Mazuda, leader of the Japanese delegation. The fifth round of talks on the agreement began July 1 here and proceeded in a friendly atmosphere. [Text] [Beijing XINHUA in English 1622 GMT 5 Jul 85]

CSO: 5100/4134

CANADA

RESTRICTIONS ON SALE OF TRITIUM TO U.S. STUDIED

Toronto THE TORONTO STAR in English 13 Jun 85 p A13

[Article by Bill Walker]

[Text] The external affairs department has launched a study to see what restrictions should be imposed on Ontario Hydro's future sales of radioactive tritium — which can be used to produce nuclear warheads — to the United States.

There is great concern about how the U.S. government may use tritium purchased from Hydro, external affairs spokesman Rejane Dodd said from Ottawa yesterday.

And the Atomic Energy Control Board, the federal watchdog agency for nuclear energy, is worried about how the Americans will guarantee that the tritium will be used for peaceful purposes, board spokesman Hugh Spence told The Star.

The board "is not certain what specifics will be required to be written in a agreement" to sell tritium to the U.S., Spence said.

External affairs and the board must approve jointly any sales to the U.S. by Hydro.

Tritium — a byproduct of nuclear reactors — is a radioactive isotope of hydrogen that sells for up to \$16 million a kilogram. It can be used for peaceful purposes, such as in medical research or in glowing airline signal lights, or it can become a key ingredient in nuclear warheads.

No tritium has yet been sold by Hydro, but a \$100 million tritium recovery plant is to be completed at Hydro's Darlington nuclear station by 1987.

Canada and the U.S. have a longstanding nuclear co-operation agreement. It says materials sold by Canada will not be used for nuclear devices, for research into those devices, or for any military purposes, Spence said.

But while the agreement covers current sales of substances such as uranium, tritium is not mentioned because there have been no sales to date.

One fear, expressed by New Democrat MPP Bud Wildman (Algoma) in the Legislature this week, is that sales of tritium from Ontario to the U.S. will free up American sources of the substance for use in nuclear weapons.

Liberal Eddie Sargent (Grey-Bruce) raised the issue in the Legislature this week when he asked the Progressive Conservative government whether Hydro tritium would be used in some role in the U.S. Star Wars anti-ballistic missile defence system.

"Tritium boosts the yield of an atom bomb about 1,000 times and is essential to the manufacture of the powerful warheads," Sargent said.

CSO: 5120/20

CANADA

GROUPS PROTEST NUCLEAR TESTING, WARSHIPS

Halifax Women's Peace Conference

Toronto THE TORONTO STAR in English 10 Jun 85 pp A1, A16

[Article by Sarah Jane Growe]

[Text] HALIFAX — Women at an international peace conference have demanded that Canada and the United Nations press for a worldwide ban on nuclear tests.

The 350 delegates wrapped up the five-day conference yesterday by sending the demand for a treaty banning such tests to the Canadian government and the U.N.

The conference also produced recommendations opposing military activity in space and weapons of mass destruction, and supporting Nicaragua.

A report from the meeting was given to Quebec Progressive Conservative MP Monique Landry, representing the federal secretary of state's department. She is to take the recommendations to the federal government and to a special U.N. session in Kenya next month.

Avoid controversy

"Militarism is an addiction that distorts human development, causing worldwide poverty, starvation, pollution, repression, torture and death," the conference document says.

The delegates — from 33 countries, although more than 200 were from Canada — also cited Nicaragua as "the model of a new kind of society" and "a symbol of hope which must be allowed to live."

But the women, who met at

Mount St. Vincent University, did not include a number of more controversial resolutions, despite pleas from Third World participants.

Instead, those recommendations were relegated to a list of about 50 "statements of affirmation," including:

- The release of political prisoners in the Philippines, South Africa and the United Kingdom;
- An end to American aid to El Salvador;
- An end to the U.S. economic blockade of Nicaragua;
- Laws to end Canadian investment in South Africa;
- Cancellation of Canada's cruise missile testing agreement with the U.S.

The "statements of affirmation" were not given formally to Landry. But delegates from the women's conference also are going to the U.N. meeting in Kenya, and they will be free to raise the "statements" there.

"I have had experience in these things," said Joanna Miller, a member of a committee advising Canada's delegation to the U.N. General Assembly. "We cannot submit a grab-bag of ill-conceived proposals."

"The people of the Third World have paid the price with their lives for these proposals," said Cana-

dian delegate Nonny McLaughlin from Quebec. "If we don't support them, we should not have invited them."

In addition, ideas concerning the Middle East were considered so controversial that they were set aside for discussion at a second international women's peace conference that was proposed for Mideast issues only.

Those ideas included support for an independent Palestinian state, return to Israel's pre-1967 boundaries, condemnation of West Bank settlements, and a Geneva conference on the Mideast that would include the Palestine Liberation Organization.

Esquimalt Base Picketing

Vancouver THE SUN in English 17 Jun 85 p A8

[Text]

Special to The Sun
ESQUIMALT — Military police kept watch Sunday on a small group of protesters demonstrating against visits here by U.S. warships carrying nuclear weapons.

Protest spokesman Phil Esmonde said most Canadians don't know nuclear-armed warships routinely visit bases in Canada and their silence is taken to mean "public compliance with the arms buildup — especially the deployment of sea-launched cruise missiles.

"But we don't think that's the case," Esmonde said in an interview during a 1½-hour protest by about 50 placard-carrying protesters in front of the gates of Canadian Forces Base Esquimalt.

Base information officer Maj. Norbert Cyr refused comment on the protest and on the issue of nuclear-armed U.S. warships visiting the base.

But he said it is national defence policy to "neither confirm nor deny" the existence of nuclear weapons aboard visiting American warships.

Esmonde said that is tantamount to an admission that the government is aware nuclear-armed warships visit Canada regularly.

He said there are U.S. warships at the base about 25 per cent of the time.

A protective ring of connected buoys prevented a small peace flotilla of powered sailboats from moving too close to Canadian warships and a U.S. submarine moored in the harbor.

The demonstration, staged by the Victoria Disarmament Group, was part of an international weekend of protest against deployment of sea-launched cruise missiles by the U.S. and the Soviet Union, Esmonde said.

Cruise missiles pose a particular problem to disarmament talks because they can be armed with either conventional or nuclear warheads, Esmonde said.

Nuclear verification is "virtually impossible under those conditions" and leads to increased mistrust about the number of nuclear weapons each side has, he said.

CSO: 5120/20

CANADA

NUCLEAR COOPERATION AGREEMENT SIGNED WITH TURKEY

Ottawa THE CITIZEN in English 19 Jun 85 p D7

[Text]

The Canadian Press

Canada signed a nuclear co-operation agreement Tuesday with Turkey, taking a halting step toward this country's first foreign reactor sale in five years.

The agreement, which lays the groundwork for future deals in such areas as reactor construction, uranium supply, use of nuclear technology in health, farming and industry, and exchange of experts and technical training, was signed in Ankara by Canadian Ambassador Gilles Mathieu and Turkish Foreign Minister Yahit Halefoglu.

The foundation of the 15-year accord is a Turkish agreement that nuclear supplies and facilities will not be used to make weapons and that it will abide by the Nuclear Non-Proliferation Treaty and open its installations to inspectors from the International Atomic Energy Agency.

While the agreement "envises co-operation in such areas as the provision of Candu reactors," still to come is the most important decision — whether the Canadian government will give its financial backing to a reactor deal given the unusual terms the Turkish government has proposed.

Atomic Energy of Canada Ltd., the Crown corporation that de-

signs and sells the Candu power reactor, has basically won the bidding for a \$1-billion, 600-megawatt station on Turkey's Mediterranean coast.

But the Turkish government wants AECL to own and operate the reactor for 15 years, recovering the costs of constructing the power station from electricity sales.

AECL has set up a consortium with British and Turkish partners to run the plant at Akkuyu. AECL would hold a controlling 60-percent interest in the consortium.

The government will be asked to provide either export financing through the Export Development Corp. or insure the consortium against any risks inherent in owning a nuclear power plant in a foreign country.

Steve Probyn, Energy Minister Pat Carney's policy adviser for nuclear issues, recently travelled to Turkey to discuss the deal.

Selling a Candu to Turkey would create about 45,000 person-years of employment in the hard-pressed Canadian nuclear industry. (A person-year is government jargon for the equivalent of a full-time job for one person for a year — or, for example, jobs for two people for six months.)

Work is still being done on two power stations sold in 1980 to Ro-

mania and four units being built by Ontario Hydro at Darlington, east of Toronto. But no other work is on the order books.

The government has still not officially seen the financing proposal from AECL, and it is understood that a decision is still some time off. The Turkish deal is the first major decision facing the Conservative government in its policy toward the Canadian nuclear industry.

Don Douglas, general manager of the Organization of Candu Industries, said the industry needs the work that would come from the Turkish deal.

But because of the risks posed by the Turkish proposal, industry spokesmen say that a negative government decision will not necessarily call into question whether the federal government still supports the Candu reactor and the industry that has grown up around it.

"It's really a buyers' market when one can contemplate this kind of thing," Douglas said.

The industry, having won the bid, wants to see the project go ahead "but we're business people too and we realize that the deal has risks," said Hal Dickout, vice-president of power systems for Canadian General Electric in Peterborough.

CSO: 5120/20

CANADA

ONTARIO HYDRO DECLINES DOUGLAS POINT STATION DEAL

Ottawa THE CITIZEN in English 20 Jun 85 p A18

[Text]

TORONTO (CP) — An \$81.7-million nuclear power plant opened in 1967 is not worth taking over even if Ontario Hydro did it for a token dollar, says a study by the provincial utility.

Atomic Energy of Canada Ltd., a federal Crown agency, built the 200-megawatt Douglas Point generating station near Kincardine and Ontario Hydro operated it under an agreement designed to reimburse AECL for its power production.

But the plant never produced power cheaply and consistently enough to offset the relatively high capital cost and Atomic Energy decided to cut its losses by closing the station in May last year.

When plans for the closing were announced, Hydro said it would study the possibility of taking over the plant. A preliminary report recommended against such a move at least until more was known about its conditions.

New documents submitted to an Ontario Energy Board rate hearing show the Hydro study team found the station needed "major capital expenditures, comparable to the cost of a new fossil plant," including complete replacement of the reactor's pressure tubes. Estimates for the work ranged from \$120 million to \$230 million in 1984 dollars.

The report said if power demands rise as expected, the plant isn't worth a \$1 takeover in the long run. The long-term cost of adding the plant to Hydro's generating system would range from \$86 million to \$157 million in 1984 dollars depending on whether it was mothballed or immediately overhauled, the report said.

The only circumstance under which the plant would be worth even a nominal \$1 to Hydro would be in a period of unexpectedly high growth in power demands. Then, operation of a rehabilitated Douglas Point station would eventually save the giant utility \$35 million to \$40 million, assuming the plant was back in service "before the mid-1990s," the report said.

"Due to the probable loss under expected or lower load growth, the relatively small potential gains under a higher load growth, and large uncertainties, it is not a reasonable business risk to assume responsibility for the reactor now or to pay AECL to maintain the reactor in a mothballed state to permit future operation," the documents said.

The report included a prediction that it will cost the federal agency between \$60 million and \$125 million to "decommission" the station, a process the utility says will extend over 30 to 35 years.

CSO: 5120/20

CANADA

BRIEFS

ONTARIO HYDRO REPAIR COSTS--Ontario Hydro expects the cost of replacing nearly 800 pressure tubes in two Pickering generating station nuclear reactors to be double an initial \$250-million estimate. In a written submission to the Ontario Energy Board, Hydro said a revised estimate of \$500 million was approved by the utility's board of directors last October. The \$500 million is in addition to about \$450 million in extra coal purchases Hydro expects to make during the three-year retubing period. Hydro said the doubled cost estimate was a result of a lack of time in preparing preliminary estimates. [Text] [Windsor THE WINDSOR STAR in English 19 Jun 85 p A10]

CSO: 5120/20

INTERNATIONAL AFFAIRS

NUCLEAR ENERGY DEVELOPMENT, CEMA COOPERATION VIEWED

Prague SVET HOSPODARSTVI in Czech Supplement No 62, 1985 pp 1-4

[Unattributed article: Priorities in R&D Cooperation Among CEMA Member Countries: Nuclear Power]

[Text] The executive level economic conference of the CEMA member countries which was held in June last year in Moscow represented an important milestone in the development of the relations among the member countries of the community and further improved socialist economic integration. The conference established long term priorities for cooperation in key national economic sectors and in the area of research and development.

Priorities were also established for the comprehensive R&D program of the CEMA countries through the year 2000. This program is currently in the formulation stages, and all the countries consider it to be primary and definitive. The fields involved are: electronics, comprehensive automation, nuclear power, new materials and technologies, and biotechnology.

In this supplement to SVET HOSPODARSTVI we will gradually focus our attention on each of these priorities. The discussion of each field will characterize world developments and summarize current findings in the given field within the CEMA, as well as future plans.

Nuclear Power

Cooperation Among the CEMA Member Countries in Developing Nuclear Power

The executive agencies of the CEMA included the development of nuclear power among the top 5 long range priorities for R&D cooperation, which is supposed to speed up the application of R&D findings in all participating countries. Cooperation among socialist countries on the peaceful use of nuclear power already has a 30-year tradition. This cooperation has taken place not only in the construction of nuclear power plants but also in non-power applications of nuclear technology in industrial production, agriculture and health care.

Bilateral Cooperative Agreements

The first agreements concerning bilateral cooperation in the peaceful use of nuclear power were signed by the Soviet Union and other socialist countries as early as 1955. The basic purpose of these agreements was for the USSR to provide assistance in the building of a R&D base, the training of scientific personnel, the construction of research-related nuclear reactors, elementary particle accelerators, physical and radiochemistry laboratories in specific socialist countries.

These cooperative efforts bore fruit at the end of the 1950s and in the early 1960s with the startup of national nuclear power research centers in Bulgaria, the CSSR, Hungary, the GDR, Poland, Romania and Yugoslavia. These facilities included 9 functioning research reactors, six accelerators (cyclotrons), and seven radiochemical and physics laboratories. Later Cuba joined in the joint efforts to develop nuclear power. Hence, the USSR assisted in gradually installing physical and radiochemical laboratories, and a research facility in 1969.

Status of Nuclear Research

An important milestone in cooperation among socialist countries in the area of nuclear power was the founding of the Joint Nuclear Research Institute [SUJV] in Dubna near Moscow in 1956. This institute merged two Soviet scientific laboratories for research in high-energy physics. The new institute also received two unique accelerators (synchro-cyclotrons) from the Soviet Government at no charge.

The charter members of the SUJV were Albania, Bulgaria, the PRC, the CSSR, the Korean People's Republic, Hungary, the Mongolian People's Republic, the GDR, Poland, Romania and the USSR. In the 1960s Albania and the PRC recalled their scientists, and North Vietnam and Cuba began to participate in institute activities. All member states have equal rights to the scientific activities of the institute and to its facilities.

At present more than 3000 people work at the SUJV, about 500 of whom are researchers. Scientists from countries outside of the CEMA also work here. Some of the countries represented are Finland, India, Belgium, Austria, and others. The institute also works closely with other centers for nuclear research, such as the European Center for Nuclear Research [CERN] in Geneva, the International Center for Theoretical Physics in Trieste, etc.

The primary mission of the SUJV is joint theoretical and experimental work in physics. These primary activities, however, are closely related to work which can lead to the discovery of still unknown energy resources.

Standing CEMA Commission for Peaceful Use of Nuclear Energy

During the development of nuclear energy R&D problems have continually arisen the solution to which has required complex and costly equipment, considerable sophistication in a number of branches of industry, and the formation of large

scientific and engineering collectives. Given these conditions, which demanded specialization and cooperation in developmental and production work, the Standing Commission for the Peaceful Uses of Nuclear Energy was formed in 1971 by decision of the 13th Session of the CEMA.

The activities of the commission, which coordinates cooperation between member countries in this entire area, are actively participated in by Bulgaria, the CSSR, Cuba, Hungary, the GDR, Poland, Romania, the USSR, Vietnam, and Yugoslavia. The commission has seven coordinating R&D committees.

The basic task of this agency is to facilitate multilateral cooperation among the CEMA member countries in reactor technology, nuclear power and its fuel cycle, as well as in nuclear instruments, radioisotope techniques and apparatus, radiational and shielding techniques, safety practices related to sources of ionizing radiation, and the standardization of products related to nuclear technology. All activities of the commission are thus directed towards the more efficient integration of nuclear technology into the economies of the member countries.

Interatominstrument

The production of instruments and nuclear equipment represents an important component of the cooperation among the CEMA countries in the peaceful use of nuclear technology. An international economic association, Interatominstrument, has been active in this area since 1972, with headquarters in Warsaw. The activities of this association are directed at coordinating work on the design and production of nuclear instruments and on the full satisfaction of the requirements of the member countries in terms of the product mix and quality of this equipment.

Interatominstrument has 51 employees, 29 of whom are specialists and 22 of whom are technical personnel. In addition to the Warsaw headquarters, branches have also been constructed at Zielona Gora in Poland, at Dubna in the USSR, and Plovdiv in Bulgaria.

Radioisotopes and Sources of Ionizing Radiation

An Agreement Concerning Multilateral Specialization and Cooperation in the Production of Radioisotopes was signed in Moscow in 1974. The first years after the agreement was signed saw the establishment of multiple production facilities in various countries for radioisotopes, labelled organic and inorganic compounds, radio-pharmaceutical preparations, sources of ionizing radiation, and a number of stable isotopes. Currently the list of products specialized in by the production facilities participating in this agreement is more than 1,250 items long.

The agreement established the responsibilities of participating organizations, the conditions of cooperation in foreign trade, pricing, etc. Organizations specializing in the production of a certain product are required to satisfy

the requirements of signatory countries with deliveries of agreed upon magnitude and according to the agreed upon schedule, and to provide products that meet the required technical specifications. Organizations not specializing in production must meet the requirements of their countries with imports of the requisite products.

Czechoslovak producers that are participating in this agreement are currently producing and delivering 200 specialized items. Deliveries of isotope production among the participating countries is showing ongoing growth while the volume of mutual deliveries between the CSSR and the USSR has reached the level of almost 1 million convertible rubles. Almost 90 percent of Czechoslovak exports of isotope production come under the terms of this agreement.

Nuclear Power and the Fuel Cycle

Just as the problem of assuring energy requirements is occupying an increasingly important place in international economic relations, so the development of nuclear power is the principal concern of CEMA member countries in the area of nuclear energy. In June 1984 the executive level economic conference of the CEMA member countries determined a strategy for the further improvement of economic cooperation among the fraternal countries, which is in turn related to an increase in public production. The conference emphasized that partner countries, in order to resolve the fuel and energy problem, must assure above all the efficient and rational use of energy resources, and likewise undertake appropriate measures in the production and mutual deliveries of fuel and energy.

An important agency for the cooperation of CEMA countries in this area is the Standing Commission of the CEMA for Electric Power, which was founded in 1956 (and which held the name prior to 1958 of Standing Commission for the Exchange of Electricity between the Member States and for the Comprehensive Use of the Water Resources of the Danube). Over the years it has been involved in the drafting of several documents related to multilateral cooperation in electric power, in the conduct of a number of research projects in the area of electricity generation, the operation of interconnected electric power systems, and environmental protection. Of the five sections on this commission, one is devoted to nuclear power.

The most important documents of the comprehensive program for the power generation sector for further improving and intensifying cooperation and for improving socialist economic integration among the CEMA member countries include:

--General Agreement on Cooperation in the Future Development of Integrated Power Systems of the CEMA Member Countries, Including the Necessary Cooperation with the Power System of Yugoslavia (dating from 1976). This agreement covers the future development of the power systems of the CEMA member countries through 1990 in practically all areas, including the integration of generation and consumption balances, the development of the sources and grid components of the integrated systems, increasing the efficiency of the production and distribution of electricity and heat, and research and development;

--Long Range Priority Programs of Cooperation [DCPS] of the CEMA Member Countries in the Areas of Energy, Fuels and Raw Materials (dating from 1978). In conjunction with the General Agreement this program includes 13 selected tasks which are the object of the joint interest of the participating countries.

The top priority in the development of the power systems in the CEMA member countries at the present time is the construction of nuclear power plants and nuclear heating plants. The installed capacity of nuclear power plants in the member countries was 26,000 megawatts in 1983 and is to be increased to 75,000 megawatts by 1990. This will represent about 20 percent of all electricity generation capacity in the countries of the socialist community. Nuclear power plants are currently operational in Bulgaria, the CSSR, Hungary, the GDR and the Soviet Union, and plant construction is under way in Cuba, Poland and Romania.

The nuclear portion of the DCPS, which constitutes the framework for cooperation among the CEMA member countries for this decade, includes:

- the construction of nuclear plants in member countries with the technical assistance of the Soviet Union;
- international specialization and cooperation in the production and joint deliveries of equipment for nuclear power plants;
- the joint construction of nuclear power plants on the territory of the Soviet Union (with the investment costs being paid back with deliveries of power).

Bilateral cooperative agreements between the Soviet Union and individual CEMA countries (Bulgaria, the CSSR, Cuba, Hungary, the GDR, Poland and Romania) are tied into multilateral cooperative agreements.

Joint Construction of Nuclear Power Plants in the USSR

In addition to the cooperation among the CEMA countries in the construction of their own nuclear power generating installations, the joint construction of such facilities in the Soviet Union itself is also very important. In 1983 operations began at the first VVER-1000 unit of the South Ukrainian Nuclear Power plant. Romania is participating with the USSR in the construction of this plant which will have an installed capacity of 4,000 megawatts when completed. Romania will receive 5 billion kilowatt hours of electricity annually as compensation for its investment outlays.

Construction is likewise entering its final phase at the Chmelnicka nuclear power plant, which also has 4 reactors with a total capacity of 4,000 megawatts. The participating countries in addition to the USSR are the CSSR, Poland and Hungary. Czechoslovak deliveries of goods and equipment valued at 235 million convertible rubles, which will be completed by the end of 1985, will be paid back over a period of 30 years with deliveries of electricity. These began in 1984 and will peak at 3.6 billion kilowatt hours annually by 1988. To provide this quantity of electricity the CSSR would have to build 600 megawatts of generating capacity with its own resources. Deliveries from this plant to Hungary and Poland will be 2.4 billion and 6 billion kilowatt hours annually respectively.

Interatomenergo

The development of nuclear power poses important tasks for the engineering industries of the CEMA member countries. These tasks must be resolved on the basis of the international division of labor, production specialization and cooperation. In addition to several bilateral agreements between the Soviet Union and other member countries that were made at the beginning of the 1970s, an important step in this direction was the establishment of the international economic association, Interatomenergo, which was created by a resolution of the 28th Session of the CEMA in 1973.

The members of Interatomenergo, which is headquartered in Moscow, are the European CEMA member countries and Yugoslavia. Among the tasks being pursued by this association are:

- the development of schedules of needs and production runs for equipment, instruments and materials for nuclear power plants;
- formulation of proposals for specialization and cooperation as well as for expanding the production of equipment, instruments and materials for nuclear power plants by the industrial sectors of the signatory countries;
- proposals for the joint planning of production of specific types of equipment, instruments and materials;
- the transmission of design and engineering data to production facilities.

Multilateral Specialization and Cooperation in the Production and Deliveries of Equipment for Nuclear Power Plants

On the basis of the General Agreement concerning Cooperation in the Future Development of Integrated Power Generation Systems of the CEMA member countries through 1990 and the Program for the Maximum Feasible Development of Nuclear Engineering Capabilities of the CEMA Member Countries, which was adopted in 1977, the Agreement Concerning Multilateral International Specialization and Cooperation in the Production and Mutual Deliveries of Nuclear Power Plant Equipment from 1981-1990 was signed in June 1979.

Under the terms of this agreement, which was signed by the presidents of the governments of Bulgaria, the CSSR, Hungary, the GDR, Poland, Romania and the USSR and a representative of the Yugoslav Government, and which contains a program for nuclear power plant construction in each of the signatory countries, each country specializes in the production of particular pieces of equipment. Czechoslovakia specializes, for instance, on reactors and steam turbines, while Bulgaria is responsible for biological shielding equipment, Hungary for water purification systems, Poland for heat exchangers, the GDR for the production of overhead cranes, Romania for main circulating pumps, and Yugoslavia for specialized armatures and pumps. The production specialization program includes 140 items and is the largest program of its kind in the world.

Construction of Nuclear Power Plants in Individual CEMA Countries

Bulgaria

In 1966 the Governments of Bulgaria and the USSR signed an agreement for the construction of the first part of the Kozloduy nuclear power plant. In 1974 this unit, with its VVER 440 reactor, was started up, and followed in 1975-1983 by three more of the same type. The fifth and sixth units of this power plant will be outfitted with the VVER-1000 reactor, so that after their completion in 1987 the Kozloduy power plant will have an installed capacity of 3,760 megawatts. Bulgaria is the first country outside of the USSR where a VVER-1000 reactor will be built.

Construction has also been started on a second nuclear power plant at Belens, with four VVER-1000 reactors. The first unit of this plant is slated to begin operations in 1991-1992.

In 1984 nuclear power plants accounted for 18 percent of the installed power generation capacity of Bulgaria, with nuclear power accounting for 28 percent of the electricity actually generated. This placed Bulgaria sixth in the world and first among the CEMA countries. In 1990 nuclear power is to account for more than 40 percent of total electricity generated.

According to the agreement among the CEMA member countries concerning multi-lateral international cooperation and specialization in the production and mutual deliveries of nuclear power plant equipment Bulgaria produces specialized pumps and armatures, biological shielding equipment and equipment for technical transportation.

CSSR

The first agreement concerning Czechoslovak-Soviet cooperation in the peaceful use of nuclear energy was signed in 1955 and set the basis for the entire Czechoslovak nuclear program, and particularly for its power generation portion. With the assistance of the Soviet Union the A1 nuclear power plant was build and made operational in 1972 with a heavy water, carbon-dioxide-cooled reactor. Because of the technical difficulties involved in the construction and operation of this type of reactor, the Czechoslovak strategy for the development of nuclear power was reevaluated in the 1970s and the decision made to switch to the proven Soviet light water reactor of the VVER series.

In 1970 the USSR and CSSR Governments agreed to cooperate on the construction of four units at the V1 and V2 nuclear power plants at Jaslovske Bohunice, with VVER-440 reactors. Similar agreements were gradually concluded for four-unit, VVER-440 power plants at Dukovany and at Mochovce, as well as for the Temelin power plant, where four VVER-1000 units will be built.

Currently three of the units at Jaslovske Bohunice are operational along with one unit at Dukovany, and their 1,760 megawatts of capacity will provide 13.5 percent of this year's total electricity consumption in the CSSR. By 1990 all 12 VVER-440 reactors are slated to be operational, and the 5,280 megawatts of

capacity are projected to provide about 30 percent of total electricity consumption. In the year 2000 the installed capacity of Czechoslovak nuclear power plants is to reach 10,280 megawatts (in addition to the units mentioned above another VVER-1000 reactor is to be built at a location soon to be named) and these facilities are to provide more than 50 percent of our electricity consumption.

The construction program for nuclear power plants in the CSSR provides for the use of these power plants as sources of heat as well. The first heat line is now being built from Jaslovske Bohunice to Trnava. It is 23 kilometers long, is designed to provide 250 megawatts of heat output, and be put into operation this year. Plans are also in place for the construction of heat lines to Hlohovce and to Leopoldov. Investment projects have already been approved or are under review for the construction of heat transmission facilities from Jaslovske Bohunice to Bratislava, from Dukovany to Brno and from Mochovce to Levice, Nitra and Tlmac. Also under study is the economic feasibility and the necessary conditions for the construction of dedicated nuclear heat sources, i.e., nuclear heating plants.

The implementation of the Czechoslovak nuclear program is placing great demands on the Czechoslovak metallurgical, engineering, electrotechnical and construction base related to nuclear power. Thanks to long term Czechoslovak-Soviet cooperation the Czechoslovak industrial base is capable of assuring deliveries of equipment for primary and secondary circuits, for reactors, volume compensators, main circulating pumps, steam generators, separators and steam preheaters, turbogenerators, etc. both for nuclear power plants built in the CSSR and for those built in other CEMA countries.

The bilateral agreement between the CSSR and the USSR on cooperation in the production of equipment for nuclear power plants, signed in March 1974, was concluded for the production of 30 subassemblies for 5 VVER-440 units. An additional agreement signed in 1976 expanded the scope of these deliveries and increased the number of turnkey VVER-440 units. At the same time the groundwork was laid for production preparations for equipment for nuclear power plants with VVER-1000 reactors. These bilateral agreements have become one of the bases for the multilateral Agreement Among CEMA Member Countries and Yugoslavia for the Production and Mutual Delivery of Nuclear Power Plant Equipment Through 1990 which was signed by government presidents of the participating countries in June 1979. The overall contract backlog for deliveries of Czechoslovak equipment for nuclear power plants in CEMA countries under this agreement now amounts to almost 1 billion convertible rubles. The CSSR is producing about 25 percent of the reactor equipment for all nuclear power plants to be started up in the CEMA between 1983 and 1990, and by 1990 it will have produced and delivered equipment for 21 VVER-440 units.

Cuba

Under intergovernmental agreements concerning economic and technical cooperation signed in April 1981 the Soviet Union is providing Cuba with technical assistance in the construction of the Juragua nuclear power plant (Cienfuegos) with a capacity of 2 x 440 megawatts. The first unit is slated to begin operation in 1987, and the second unit a year later.

This power plant is being built according to a design different from that used in other countries where VVER-440 reactors have been built. The design changes reflect the conditions at the site; a tropical climate with high atmospheric humidity, a high level of seismic activity, electrical equipment that works on 60 Hz frequency cooling with ocean water, etc.

Hungary

Construction of the Paks nuclear power plant, which has four 440 megawatt units, began in 1974. The first unit was hooked up to the grid in 1983, and the second unit will be on line in the near future. The third and fourth units are to come on line in 1987 at which time this facility will cover about 25 percent of the country's electricity requirements.

Under a multilateral agreement between the CEMA member countries and Yugoslavia concerning the production and delivery of nuclear power plant equipment Hungary is specializing in machines for exchanging fuel, electrotechnical equipment, specialized equipment for repairing components and water purification equipment.

GDR

The experimental nuclear power plant at Rheinsberg with a capacity of 70 megawatts was the first VVER type reactor built outside of the territory of the USSR and has been in operation since 1966. Between 1973 and 1979 four VVER-440 units were gradually placed in operation at the Nord industrial nuclear power plant (Bruno Leuschner) near the city of Greifswald on the shore of the Baltic. Nuclear power accounted for 12 percent of total generated electricity last year.

The program for the development of nuclear power through the year 2000 includes plans for an additional 4 VVER-440 units, currently under construction at the Nord facility. When they are completed in 1990 the installed capacity of 3,520 megawatts at this site will make it one of the largest in the CEMA. The program also anticipates using VVER-440 reactors to supply heat. Since 1983 a 22 kilometer line has been in operation from the Nord power plant to Greifswald that is capable of transmitting heat equivalent to 300 megawatts of output. During the first phase (winter 1983/84) the output of this line was 40 megawatts, and a year later this was increased to 150 megawatts.

Another step in the building of a nuclear power system is the construction of the Stendal power plant which will have 2 VVER-1000 units. The first unit should be operational in 1990.

The GDR contributes to nuclear power plant equipment deliveries within the CEMA with overhead cranes and other equipment for technical transportation.

Poland

The government approved program for nuclear power development in Poland through the year 2000 provides for the construction of nuclear power plants with a capacity of 7,860 or 9,860 megawatts, allowing the nuclear power plants to provide roughly 30 percent of electricity consumption by the year 2000.

In April 1983 a USSR-Poland agreement was signed for cooperation in the construction of the first Polish nuclear power plant at Zarnowiec with four 465 megawatt units. The first unit, on which construction began last year is slated to come on line in 1990, and the entire power plant is to be operational by 1994. Poland is providing the turbine assemblies for this power plant.

Construction will begin on a second nuclear power plant at Kujawy or a Warta in 1987. This plant will have four VVER-1000 units and is scheduled for startup in 1994. A third power plant, also with four 1000 megawatt units would have to be started in 1989, and a site for it has to be chosen by early next year.

The government program for nuclear power development also includes the production of specialized machinery and power equipment for domestic use as well as for export under multilateral cooperative agreements with other CEMA countries. Under these agreements Poland produces volume compensators for power plants built within the CEMA, steam generators and other heat exchange systems. It also produces backup diesel engines and equipment to monitor radiation safety.

Romania

In Romania two power plants are currently under construction and preliminary construction work is under way for a third unit at the Cernavoda power plant. The reactors at this power plant are CANDU Canadian reactors with a unit capacity of 660 megawatts. They are heavy water reactors with pressurized piping. Romania has shown an interest in the purchase of 10 CANDU reactors.

Under a Romania-USSR agreement signed in September 1982 the Soviet Union will assist Romania in the construction of the Moldova power plant, which will have 3 VVER-1000 units. The first unit of this power plant is expected to be operational in 1990.

Under the multilateral agreement among the CEMA member countries for the production and delivery of nuclear power plant equipment for VVER reactors Romania specializes in main circulation pumps, overhead cranes for reactor and turbine buildings, and on some equipment for the emergency cooling system.

Soviet Union

The development of nuclear power in the Soviet Union is currently based on 2 types of reactors: the VVER, a pressurized water, light water moderated and cooled reactor, and the RERK, a graphite moderated and boiling water cooled reactor. VVER reactors also form the basis for the development of nuclear power in other CEMA countries, and 2 units are operational as well in Finland (Loviisa).

The VVER series has its origins in 2 reactors at the Novovoronezh power plant (with capacities of 210 and 365 megawatts) and in the Rheinsberg reactor (70 megawatts). These reactors served as the basis for the development of 440 megawatt and 1000 megawatt units. There are now 28 VVER reactors in service.

RBMK reactors are being built only within the USSR at present. There are 17 units in service with a unit capacity of 1000 megawatts. At the end of 1983 the first 1500 megawatt unit was put into service at the Ignalina nuclear power plant.

The installed capacity of nuclear power plants in the USSR was 12,600 megawatts in 1980. An additional 24,000 to 25,000 megawatts is scheduled to be added by the end of the current 5-year plan, with nuclear power providing an estimated 220 billion kilowatt hours of electricity during this period. In 1984 nuclear power plants provided about 9 percent of total electricity generated, with an installed base of more than 27,000 megawatts. By 1990 installed nuclear power plant capacity should reach about 55,000 megawatts, with an additional 10,000 megawatts of capacity to be added annually in subsequent years.

Attention is also being paid to the use of nuclear power to generate heat. The first experiences in this area were obtained from the Belojarsk nuclear plant, with the Bilibin nuclear power plant also generating heat as well as electricity. Design work is in process for supplying heat to Kursk from the Kursk power plant and to Volgodonsk from the Rostov power plant. Odessa and Minsk will also be supplied with heat from existing nuclear power plants, Odessa from the Krymsk power plant.

A special light water reactor with a thermal output of 500 megawatts has been developed for use in nuclear heating plants, i.e., those designed exclusively to provide heat. The design of this reactor allows it to be built 2-3 kilometers from the nearest built-up section of the location to be supplied. Experimental facilities of this type are now under construction in Gorky and in Voronezh.

The USSR is also devoting considerable attention to the development of breeder reactors, the physical principle of which allows them to generate not only electricity and heat, but also new fuel for reactors that work with so-called thermal neutrons (both the VVER and RBMK series are such reactors). This represents an important solution to the problem of declining uranium deposits, which have so far been the sole source of nuclear fuel. Two experimental BOR-60 breeder reactors are operational: the BN-350 reactor at Sevcenko on the shore of the Caspian Sea which, in addition to generating electricity also desalinizes sea water, and an industrial BN-600 reactor with a capacity of 600 megawatts at the Belojarsk nuclear power plant. Scientists are working on designs for breeder reactors with capacities of 800 and 1600 megawatts.

Yugoslavia

Yugoslavia also participates in the joint work of the CEMA countries in the development of nuclear power. In Yugoslavia the Soviet Union assisted in the construction of a national nuclear research facility in the late 1950s and early 1960s under a bilateral agreement. Yugoslavia is a charter member of the Joint Nuclear research Institute and participates in the activities of the Standing CEMA Commission for the Peaceful Uses of Nuclear Power.

The Krsko nuclear power plant, with a capacity of 664 megawatts has been operational since 1983. It is equipped with a pressurized water reactor from the American company, Westinghouse.

Yugoslavia produces steam separators, collectors and piping for the Soviet RBMK-1000 reactors as well as specialized armatures and pumps under the multi-lateral agreement among the CEMA countries for mutual deliveries of nuclear power plant equipment.

9276
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BULGARIA

KOZLODUY NUCLEAR STATION SHORT OF BUILDING MATERIALS, EQUIPMENT

Explanations for Supply Problems

Sofia BULGARSKI PROFSOYUZI in Bulgarian No 4, 1985 pp 6, 7

[Article by Angel Milev: "Without Debts to Site Number One"]

[Editorial comment] Under the direction of BULGARSKI PROFSOYUZI, and in honor of the 13th Congress of the Bulgarian Communist Party, a socialist competition is taking place between the collectives completing the construction and installation work and the supply of materials for the timely completion and start-up of the fifth power block at the Kozloduy nuclear power station [AEK].

[Text] May the fifth power block, site number one in our construction, enter the ranks on time! This is now the primary task of the builders and fitters at Kozloduy, the task of workers and specialists from many enterprises of the construction and machine building industries.

The task is a responsible one, with great economic and social effects. In spite of this there are people who underestimate it. Who are they? Which posts do they occupy? How and why hamper the work?

It is difficult to answer this stream of questions in a few words. But the facts themselves throw an abundance of light on them. When we go to the builders and fitters, or we visit the enterprises, which have negotiated contracts with the AEK, the picture becomes clear.

In January and February the brigade of twice hero of socialist labor Gospodin Yordanov did not fully complete the expected construction and mounting work, because the front for its work had not been created. Apparently the blame lay with the brigade of hero of socialist labor Ivan Lichev, but he also did not fully utilize the capacity of his brigade and the possibilities of his people, since the enterprises which make large steel cells, reinforced concrete constructions and other equipment and parts had not fulfilled their contracted obligations to the complex; they broke deadlines which they themselves had accepted and signed.

The managers of all these enterprises, the divisions of the Montazhi State Economic Trust, the Stomanobetonni konstruktsii i Izdeliya Economic Combine, the Khidrostroy State Economic Trust, the Stroitelni Materiali Corporation, and of the machine construction industry reply: "the Metalsnab State Economic Trust did not ensure the supply of the necessary materials. But it is not to blame!"

Thousands of tons of iron for the concrete, high tensile steel, rolled steel, various types of sheet metal, etc., are not lost in the files of the supply organization. Where are they then? Why are they not at the site in Kozloduy or at the enterprises which are working on it? Who is responsible for this? The Metalsnab State Economic Trust and its general director Strakhil Petrov, or the general directors of the metallurgic combines in Kremikovtsi and Pernik and the cast iron foundry in Ikhtiman? Or the general directors of the construction combines and organizations, Velko Bulgaranov, Ivan Krustev, Kamen Kamenov, or...?

The vice general director of the Metalsnab State Economic Trust, Aleksandur Kashukeev, says: "We plan for what the construction organizations need, and they have a limit for this." But the builders explain: "We need everything that is necessary for developing an excellent reinforced concrete construction. If one meter of iron or 100 kilograms of cement is lacking, we cannot replace this with dry twigs or white soil."

Sheet steel is in short supply at the fifth power block, as are high quality steel and other metallurgic products. Practice reveals this. It neither covers up the truth nor forgives anyone; it always lays the blame for final results at someone's doorstep, those who stand by the lathes and machines. For example, during the first three months of this year, 1,230 tons of iron for concrete, with a diameter of eight millimeters, was needed by the Stomanobetonni Konstruktsii Economic Combine to carry out the construction program at the Kozloduy AEK and at other priority construction sites. By the middle of February the enterprise had received nothing. At the same time the Montazhi State Economic Trust was expecting 100 tons of six-millimeter sheet metal, and the Promishleno stroitelstvo State Economic Trust, more than 3,000 tons of steel for concrete.

"They will have to wait at Kozloduy," the employees of the supplying organizations say with compassion, somewhat tired of quarrels with procedures and consumers. They talk like that because they know that we cannot help them with anything. And the producers have closed the doors of their warehouses and unceremoniously announce that they can give nothing more. Perhaps we are to blame, they say, but that is the situation. But what is this situation, how did it arise, who created it? Any literate person can see: the plans for the production sections of the metallurgic combines are developed according to the full utilization of production capacities. This is most important. Second, often as a result of imprecise forecasting in one planning branch or another, unanticipated demands arise, and complying with them creates holes in supplies. Third, unexpected accidents cannot be excluded, these sometimes take out whole lines for a week or two.

But these are the minor troubles. The great, aggravating pain in supply belongs to the planning organizations which are legally responsible for the lack of correspondence in the plans affirmed for construction and limiting the materials for it; these are often unattainable, and in some cases they cannot be imported. Undoubtedly this pain, which comes from the top, reaches down to the lowest rungs and hinders the movement of the construction organism. For example, in the first three months the Promishleno Stroitelstvo State Economic Trust had a production plan, the fulfillment of which required 18,900 tons of rolled steel, but the limit determined for that goal was 12,500 tons, without taking into account the corrections made in the anticipated construction and installation work. It was necessary to save 6,400 tons of metal in three months, but how? Were there not some hidden reserves somewhere, covered with a tarpaulin in some warehouse, or was not it possible to substitute something else for the rolled steel? In this case, what would happen with the quality and reliability of industrial construction? And what would they do at such construction sites as Kozloduy, where the designer and investor can tolerate no deviation from the working designs and blueprints? Naturally, since they had no other choice, the construction organization "consumed" it from the second quarter and will end the year in the red, and striking out this debit will take a lot of time from people, wreck their accounts, and keep them on tenterhooks for long periods.

We will not comment on the objective character of certain facts, which have created such a situation. The question is not for managers of construction and other economic organizations to be forced to demonstrate unrealistic needs, or for them to make savings which can have the opposite results.

It is necessary to act more sensibly in regard to the requirements of objective economic laws for planned, proportional development. In order to do this, all material balances should speak the same language, in order to link the scope and quality of construction and fitting work with the quantity and quality of construction materials. There is room for improvement in the work of metal producers and organizations in the assignment and transport of materials to consumers. The slightest failure to anticipate reflects negatively in the metallurgic combines, even if there is time to correct it, because this influences, in a particularly strong way, the instability of supply of raw materials and the shipping of finished products. In the first half of February, at the L. I. Brezhnev Metallurgic Combine, they had around 3,000 tons of iron for concrete, and the enterprises which were making construction pieces for Kozloduy were looking for it under rocks and trees. But it could not be shipped to them, for the simple reason that cars with loose freight were freezing, and the installations which heat them up and clean them were not able to complete this work in time.

Unfortunately the dispatch of small parcels, which takes place by special vehicle transport, was slowed. In fulfilling the 39th Council of Ministers Letter, the organs of control place sanctions on those organizations and drivers who use the trucks for transport outside their rayons. And when

the Promishleno Stroitelstvo State Economic Trust was furnished with a special permission, local branches of Metalsnab in Pernik and Ikhtiman tried to guarantee that they would be free of eventual fines as freight shippers. But there is no such guarantee, and because of this 20-ton freight vehicles with trailers were forced several times to return without loads from Ikhtiman to Stara Zagora, while in Kozloduy they were waiting for the pieces.

There are worse cases. Last year three plants of the Montazhi State Economic Trust produced more than a kilometer of piping, on request of Gazstroy-Montazh in Gorna Oryakhovitsa; the tallest basketball player in the country could pass along inside the pipe, standing straight up. The collective carried out its work well, but it fell into debt, as they say, for one million leva. The AEK did not ensure a front for installing this, for all the reasons cited above. Still it had to pay for it. But according to the Regulations for the Economic Mechanism, the investor cannot pay for something he has not used. In short, the Kozloduy AEK insisted on maintaining the agreement while the production was completed, and when the partners informed them that they were ready, they started to beat a different drum, and they wondered how they would arrange the payment.

A great danger exists in starting up the fifth power block late. This is why now the major means for speeding up construction at the fifth power block of the Kozloduy AEK is to apply the economic approach everywhere, in order to move the economic levers with full advantage for site number one, to expand socialist competition with renewed vigor.

Blame Placed for Non-Fulfillment

Sofia RABOTNICHESKO DELO in Bulgarian 14 Jun 85 pp 1,3

[Article by Iliya Borisov: "Who is not Fulfilling His Obligation and Why"]

[Text] Of the anticipated 20 million leva cost of equipping the site at Kozloduy, barely 4 million leva has been spent so far on machines and equipment that have been supplied. The combine for heavy machinery in Radomir is seriously late in filling its orders, and this threatens the flow of construction and installation work. The low quality of large steel cells (SYaM) produced at the plants of the Economic Combine for Heavy Machine Building in Ruse continues to cause alarm.

The contours of the first 1,000 megawatt reactor are now taking shape. Everything is directed to one common goal: beginning the start-up operations within a year in order to include the 1,000 megawatt block in the nation's power supply system.

Among the many problems and unresolved tasks, the question of timely supply of local equipment stands out. A number of enterprises devote themselves sensitively to their responsibility and assist in the timely fulfillment of contracted agreements. The investors directorate at Kozloduy has expressed its satisfaction with the significantly improved work in securing

equipment from a number of suppliers. In one of the previous publications from this correspondent's post, critical words were directed at the Elprom-Energo Combine in Sofia, and the Vaptsarov plant in Pleven. A check has now shown that measures have been taken to overcome the delays permitted by these two suppliers. The Elprom-Energo Combine in Sofia has made up for the delay and at the end of May delivered the equipment for the first transformer. The Vaptsarov plant in Pleven also took serious measures for producing and dispatching some of the pumps. The head of the Mestni Dostavki section, engineer Metodi Ierziyski, shared his satisfaction with the rapid and effective work at the Struma plant in Pernik, where a competition has been organized for timely fulfillment of orders for the fifth power block. The brigade leader has visited the site and become acquainted with the tasks which his brigade has to carry out. Recently a special team from the Sofia okrug placement-supply organization, headed by director Kiril Kurtev, visited the construction and, without any obligation, has agreed to help, by carrying out work worth more than 300,000 leva. The collective of the Narkoop in Vratsa voluntarily offered its services to furnish the new kitchen and dining hall, as well as supplying equipment worth 100,000 leva. There are other such examples, which show that enterprises that have agreed to participate in the socialist competition in honor of the Thirteenth Party Congress, directed by BULGARSKI PROFSOYUZI, have mobilized the efforts of the supply collectives for attaining this great goal.

Unfortunately, there are still many questionable actions. We should not forget that about one hundred enterprises are participating in equipping the new type 1,000 megawatt reactor. And each of them has its greater or lesser obligation. The delays are great. In the first five months of this year only four million of the anticipated 20 million leva worth of equipment has been supplied.

Once again, for the ~~N~~th time, engineer Boris Georgiev, director of the Directorate for Investor Control at the Kozloduy AEK, and other specialists and builders from Promishлено Stroitelstvo management spoke about the unsatisfactory and low quality of production of large steel cells made by the Ruse Combine for Heavy Machine Building. People in the brigade of hero of Socialist Labor Ivan Lichev are forced, through additional work and many other efforts, to correct the quality problems and bring the construction parts into compliance. Time is lost, technologies are violated, suitability and quality of construction and installation work is at risk. And what we need least of all here is to overlook these basic things! It is high time we understood that everything produced for this unique power block must be of high quality, so that it will be reliable in the future, when it is put into use.

Most alarming is the situation with supplies from the Economic Combine for Heavy Machine Building in Radomir. It must furnish three emergency hermetic locks, each of which weighs 46 tons, and the basic lock weighs 92 tons. This is 230 tons of equipment, production of which has not been started, and even less is known about when the production will be completed. Installation of the locks is designed to take place simultaneously with construction

of the reactor section. This is the cause for all the talk here of having to stop construction temporarily at a certain level. In the agreement signed by the combine in 1983, it was anticipated that fulfillment would take place at the end of that same year. Deadlines have been pushed back several times, and it now seems that they will not be kept. Again in Radomir they were supposed to produce three hydraulic locks, but as of now none has been made.

The excuses are most varied: "We have no materials, we are working on export items," "The equipment is new, that causes difficulties." Perhaps these are true, but we are talking about an order that was placed four years ago . . . Is not this sufficient time to find the correct way?

There are other gaps as well in the supplies from the plants. Not everything is in order at the investor directorate, which is sometimes slow in its agreements and the timely assurance of designs for various orders.

Taking into account the significance of this sight for resolving our power supply problem, the supplying enterprises must manifest the necessary comprehension and, with priority, on time and with high quality, develop and supply everything needed at the fifth power block. This will bring about a real contribution to setting it in operation next year and ensuring the necessary power supply for the national economy.

12334
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BULGARIA

KOZLODUY NUCLEAR UNITS' OPERATION EXCEED ALL CEMA RECORDS

Sofia RABOTNICHESKO DELO in Bulgarian 23 Jun 85 p 2

[Article by Iliya Borisov: "The Creation of the Atom"]

[Text] Today, power supply engineers in our nation are celebrating the holiday of the profession. During this year there have been many reasons for speaking about those who provide heat and light for our homes, for the electric energy which powers machines in hundreds of factories and plants. In today's issue, we will speak about people who have made the greatest contribution to the fulfillment of responsible assignments which the power supply engineers are solving; these people are the workers at the Kozloduy Nuclear Power Plant [SAEK].

Here the peaceful atom rages day and night. And that is how it has been for eleven years. Powerful currents of electric energy have been flowing during this time from high tension lines to the nation from Kozloduy, on the shore of the Danube. Expressed in figures, this means 30 percent of the total production in the nation. And the SAEK itself is secure and stable source of light, heat, and energy.

I asked where the action is the hottest these days. They told me that work is intensive everywhere, because there are no front lines or rear guards here. Everything has to be in order and in good shape; the processes of burning nuclear fuel in an atomic reactor are complex.

As with the other personnel, the people working at the reactor shop have carried out their duties conscientiously during the difficult winter months. Full loading was achieved during the five months of winter. The first atomic plant produced 6 billion kilowatt hours of electric power. This is a record, the best result ever in the CEMA countries which use this type of water-water reactor.

But no one is resting on his past laurels. There is no time for rest. I saw, on an illuminated board, the awe-inspiring accounts of daily, monthly, and annual production of electric power. The six-month plan has been fulfilled ahead of schedule, by 13 June. By the end of the month, the Kozloduy power supply engineers will secure half a billion more kilowatt hours than planned, a truly great success.

"The most important of these fine results in production is the timely and high-quality conduct of the repair campaign," the director of repairs, engineer

Dimitur Petrov said. "We have already finished reloading the third block. Now, on the eve of Energy Day, we have finished work on the fourth block ahead of schedule. We are getting ready for the repairs on the remaining two, so that by October we can meet the fall season fully ready."

"True commanders of the peaceful atomic front have matured during the past few years at our power plant. These are people who skillfully manage the complex production technology," reported the vice chief director, engineer Stoyno Georgiev. "Soviet specialists have helped us a lot; we work closely and cooperatively with them."

One of my most interesting sources is the plant's chief director, engineer Georgi Dichev. I remember him from the time when he first came here. A good bit of time has passed since then. Now he is burdened by years, but he works with the same passionate energy, seeking to get involved in and see everything, to help and encourage. The fruit of his restless character and creativity is strengthening scientific activity and the successful resolution of important problems in the field of scientific-technical progress.

And he is satisfied with the collective's achievements on the eve of Energy Day: "We have provided 106 million kilowatt hours of power, simply by the early completion of repairs and the reloading of the third block; that is equal to 40 thousand tons of imported coal."

Today and tomorrow, day and night, the heart of the first nuclear plant beats steadily. The peaceful atom will rage. The Kozloduy power supply engineers are aspiring to a new goal: producing 30 billion kilowatt hours of electric power this year. This is their promise in honor of the upcoming Thirteenth Party Congress. And they will be good to their word.

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BULGARIA

NEW SCIENTIFIC-TECHNICAL METHODS DEVELOPED AT NUCLEAR POWER UNIT

Sofia RUDNICHAR in Bulgarian 13 Jun 85 pp 1,2

[Article by Nevena Markova: "Efficient Collectives"]

[Text] Great opportunities exist at the Kozloduy Nuclear Power Unit [SAEK] for implementing the achievements of scientific-technical progress and the four power blocks of the VVER-440 type which are in operation. Several program-creative collectives were created for this purpose, and they contribute to increasing the efficiency of power production.

In terms of the tasks which are being carried out in this regard, the chief director of the nuclear power plant, engineer Georgi Dichev reported:

"Efficient, creative collectives have been created to resolve our scientific-technical problems. Worthy of praise in this area is the Base for Development and Implementation, headed by engineer Radoslav Georgiev. And with its machines and technology for production, the nuclear power plant represents a solid base for technical progress here.

"Over the course of several years, we developed a sufficient number of topics linked to optimizing nuclear fuel. The results attained have a significant economic effect. Our conclusions and proposals were fully affirmed at a consultation with Soviet specialists."

During the repair campaigns this year, the four power blocks will be loaded with fresh fuel, according to a new reloading method. The economic effect, based on a unit of fuel equal in value to the savings of nuclear fuel, will reach more than 26 million leva for three reactors. This development is the work of a creative group with the following staff: engineer Nikola Alekov, and physicists Rangel Simov, Taveta Khalampieva, and Radka Milanova, led by engineer Georgi Dichev. The collective has been recognized for its inventiveness and it has been awarded a design citation.

A scientific production group led by engineer Georgi G'oshev is working successfully on problems of radio-nuclidic control at the Kozloduy SAEK.

"We already have two recognized inventions," engineer G'oshev says, "for the first time in our nation, we have implemented a new method for controlling

iodine-129. Last year we introduced a system for machine processing of data by radiation control, which significantly eases our work. By the end of 1985, we will implement a new method for cleaning liquid concentrates from the cesium radio-nuclides at the plant."

One of the tasks, which is being resolved by the program-creative collective led by Radoslav Georgiev, is linked to the problem of computerizing the operative management of the four power blocks. The program has been worked out in detail, and the necessary means have been refined; the first results are already available.

The work on robotization and mechanization of labor has also produced good results. Many mechanisms and devices have been developed and realized. The need for robotic devices for defect detection control and hermetic sealing of the steam generator pipes, however, is great. Thus the attention of many specialists has been turned in this direction.

The efforts of the Kozloduy innovators have been directed toward problems such as: increasing the technical and economic efficiency of the technological processes; implementation of avant-garde repair technologies; utilization of low-potential energy for technological media; forecasting the behavior of equipment, metallography, defect detection, etc.

There is no doubt that, working with their characteristic diligence, they will bring all this to a successful conclusion.

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GERMAN DEMOCRATIC REPUBLIC

REVIEW OF 30-YEAR DEVELOPMENT OF NUCLEAR RESEARCH, TECHNOLOGY

East Berlin KERNENERGIE in German No 5, May 85 pp 209, 210

[K. Rambusch: "Development of Nuclear Research and Technology in the GDR"--
Dedicated to the 40th Anniversary of the Liberation from Fascism]

[Text] Ten years after the victory over fascism, the development of nuclear research and technology was begun, and thus the peaceful use of nuclear energy in the GDR.

On 28 April 1955, an "agreement on assistance by the USSR to the GDR for developing research in the field of nuclear physics and the use of nuclear energy for the economy" was concluded at government level.

In the preamble of the agreement, the great importance of using nuclear energy for peaceful purposes is particularly stressed. It was agreed that the Soviet authorities would deliver the equipment for construction of a water-water-reactor with a thermal capacity of 2,000 kW and a cyclotron for energy of 25 million electron volts for Alpha-particles, and grant further support through corresponding scientific-technical assistance and support in planning, building, assembling, adjustment and start-up, and in addition through transfer of scientific information and technical data. Complementary training of scientists, engineers and students at Soviet institutions is provided for. Furthermore, delivery of fissionable and other materials is arranged. Information and data for the reactor and the cyclotron is given gratis. Payment for equipment, materials and planning work is carried out within the framework of the existing trade agreement.

The agreement of 28 April 1955 was of very special significance for the GDR. The provisions of Control Council Law Nr. 26 of May 1946 were written especially with a view to limiting or forbidding, respectively, research and development in the fields of nuclear physics and nuclear energy. Lectures at universities and technical institutes on the "structure of matter" imparted approximately the state of knowledge as it existed in the mid-thirties and late thirties. The intellectual and material support and assistance offered by the USSR could not be overestimated. The GDR had to expend great efforts and funds in order to utilize the proffered help and support for direct promotion of scientific-technical research. It is characteristic of SED policy and the work of the GDR government that the numerous

prerequisites for utilizing the proffered possibilities were created on such a large scale and during a relatively short timespan.

After intensive preliminary work and clarification of a great number of personnel questions, on 11 November 1955, the GDR Council of Ministers passed resolutions on the formation of a scientific council for the peaceful application of nuclear energy and on the founding of an office for nuclear research and nuclear technology.

The "Scientific Council for the Peaceful Application of Nuclear Energy" was composed of representatives of the party, the government, and scientists. Prof Dr Gustav Hertz was appointed chairman. The chairman of the Council of Ministers appointed the chairman and members of the scientific council. The scientific council was to advise the Council of Ministers on all questions of peaceful use of nuclear energy. The necessary basis was created through the formation of special commissions, and extraordinarily great and valuable work was carried out which was of great importance when newly founded institutes and plants took up their work.

The Office for Nuclear Technology and Nuclear Research, a state central leadership organ operating under the direct control of the Council of Ministers, was responsible for promotion, coordination and control of all work in the fields mentioned; it had to work out and instigate long-term planning and carry out the necessary coordination with the ministries and central institutions.

On 1 January 1956, the Central Institute for Nuclear Physics was founded. After considerable construction, assembly and installation work, on 16 December 1957 the 2-MW (th) research reactor supplied by the USSR was started up in this institute, and the cyclotron became operational on 1 August 1958. A special achievement during the initial phase of the institute was the drafting and construction of the Rossendorf ring zone research reactor which became available for research tasks by the end of 1962.

Additional institutes for nuclear research and nuclear technology were founded in the early years, which started research work very soon, such as the institutes for

1. applied physics of purest materials by the Ministry for Ore Mining and Metallurgy,
2. physical mass transfer (now the Central Institute for Isotope and Radiation Research),
3. applied radioactivity by the Ministry for Chemical Industry,
4. research into dust and radioactive floating particles by the Office for Nuclear Research and Nuclear Technology.

In November 1955, the department for nuclear technology, founded within the framework of the Technical University of Dresden, began training students

in the specialized fields of nuclear physics, radiochemistry, nuclear energy and actinometry. The installations necessary for this training had also been constructed in a very short time.

Also of great importance was the founding of the state-owned Vakutronik plant, Dresden, in 1956. This enterprise developed and produced measuring instruments and special installations for nuclear physics, and essentially managed to supply the rapidly growing demand in ensuing years. Today, this enterprise is part of the state-owned combine Messelektronik. It must also be mentioned that the state enterprises Carl Zeiss Jena, Transformatoren und Roentgenwerk Dresden, Laborbau Dresden, Rathenower Optische Werke and others were already actively at work by 1956/57 within the framework of nuclear research and nuclear technology.

The use of radioactive and stable isotopes in applied research, medicine, and in many forms in industry, was achieved to an astonishing degree. It was made possible through the cooperation of the institutes and enterprises mentioned above.

The agreement of 29 April 1955 was the basis for further agreements and arrangements which in the ensuing years were concluded between the governments of the GDR and the USSR, central state authorities, scientific institutes and enterprise, respectively. The agreement on granting technical assistance in the construction of the first GDR nuclear power plant must be cited as one of the most important ones. This agreement made it possible for extensive work to be organized and begun in the research institutions and industry for use of nuclear energy in the production of electric energy. A Scientific-Technical Office for Reactor Construction was founded in 1958 in order to use the proffered assistance and to initiate and carry out the necessary development and research work. Taking on construction and planning work for the first GDR nuclear power plant necessitated expansion leading to the formation of an enterprise which, as of 1962, became responsible for the preparation, projection, construction, start-up and operation of the Rheinsberg nuclear power plant.

In 1962, the Office for Nuclear Research and Nuclear Technology was dissolved. By merging the research establishments of the office with the Academy of Sciences of the GDR, by integrating the enterprises in the respective economic units, and by forming the "State Center for Radiation Protection," which later became the State Office for Nuclear Safety and Radiation Protection of the GDR, it was possible to preserve the valuable results and work experience in nuclear research and technology and to work on the ensuing tasks within the respective institutions. Consequently, the department for nuclear technology of the Technical University of Dresden was also dissolved and the special installations and institutions were merged with the regular departments.

The tasks and work of the "Scientific Council for Peaceful Use of Nuclear Energy" were transferred to the Research Council of the GDR.

When the Rheinsberg nuclear power plant became operational in May of 1966, the first phase of development and organization, recognition of the tasks and expenditures for the future use of nuclear energy for production of electric energy, was concluded.

The next phase was determined by the "agreement of 14 July 1965 between the government of the GDR and the government of the USSR on the expansion of cooperation in the construction of nuclear power plants in the GDR."

That agreement, and appropriate amendments, deals with the construction of the Nord nuclear power plant and regulates the services, deliveries and obligations of the partners to the agreement. In accordance with the declared intentions of the agreement, after a 4-year construction period the first stage of the power plant with 440 MW (e) was put into test operation in December 1973, followed by the second unit in 1974. At present, the nuclear power plants constructed and operating in the GDR provide more than 11 percent of the electric energy produced. Their share of the republic's installed capacity amounts to a little more than 8 percent. In the coming years, the fifth through eighth units of the Nord nuclear power plant will begin operation with 440 MW (e) each, so that the final capacity of the power plant will reach 3,520 MW (e). The Stendal nuclear power plant with 4 reactors of 1,000 MW (e) each will begin operation according to the government's stipulations. Training of expert personnel for development, planning, construction, start-up, operation and maintenance is being carried out at the Technical University of Dresden and the Engineering Institute in Zittau. In 1978 and 1979 respectively, these institutes of higher learning managed to make teaching and research reactors operational based on their own designs.

The state and economic institutions necessary for peaceful use of nuclear energy are integrated in the socialist state structure of the GDR.

The Council of Ministers of the GDR determines development goals and construction stages of the nuclear power plants. The resolutions of the Council of Ministers passed at the end of 1983 contain the tasks for the coming years and clarify the prospective development of peaceful use of nuclear energy.

The state planning commission and the GDR ministries are responsible for the balance sheet and execution of the resolutions. Implementation is carried out by the combines and foreign trade enterprises under the ministries, and by the Academy of Sciences. The combine Kraftwerksanlagenbau, Berlin, for example, must assume the general contractorship for the construction of nuclear power plants. This task comprises the preparation, planning, and coordination of work for construction of the installation, including their own performance in providing equipment and assembly work, start-up and test operation. The general contractor is responsible for maintaining safety regulations and must provide proof of the nuclear safety of the nuclear power plant.

The tested installation is given (sold) to the state combine Kernkraftwerke "Bruno Leuschner," Greifswald. This combine, as principal investor is responsible for providing the investment funds, details of the order, the construction site, integration of a nuclear power plant in the planned territory, and obtaining from the Office for Nuclear Safety and Radiation Protection the coordination and permits necessary for construction. The Kernkraftwerke combine is also responsible for the plant, compliance with the very strict regulations on operation and control, procurement of nuclear fuel, maintenance and necessary repairs.

It behooves us to remember that the victory over fascism in 1945 was the basic event for the peaceful use of nuclear energy and the 30-year development of nuclear research and nuclear technology in the GDR, and that during the entire period active assistance and support was granted by the USSR.

9917
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INTER-AMERICAN AFFAIRS

BRIEFS

NUCLEAR TESTS DENOUNCED--Quito, 29 Jun (DPA)--The South Pacific Permanent Commission, with the mandate of Colombia, Chile, Ecuador and Peru, today denounced the increase in French nuclear tests on the Mururoa Atoll saying that there have been four in less than 6 months. According to the commission, the explosions took place on 1 and 9 May and 4 and 8 June of this year, as compared with only three tests in 1984. The four explosions this year bring to 70 the number of nuclear tests carried out by France since 1960, when it began testing atomic devices on the Mururoa Atoll in the South Pacific between Tahiti and Easter Island. The commission, an intergovernmental organization based in Quito, also stated that "France has ignored the protests of the Pacific Basin countries." It added that the nuclear explosions seriously damage marine resources in the South Pacific. The explosions are detected by seismographers in New Zealand and Australia and reported to the Pacific Basin countries.
[Text] [Hamburg DPA in Spanish 1538 GMT 29 Jun 85]

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ARGENTINA

COSTANTINI: NUCLEAR POLICY IS NOT IN CRISIS

Buenos Aires CLARIN in Spanish 2 Jun 85 p 16

[Text] The head of the National Commission for Atomic Energy (CNEA), Alberto Costantini, said yesterday in Bariloche that "the Argentine nuclear policy is not in crisis," although he admitted that the advances in connection with the nuclear electric power plants will be limited for the time being "to the realm of concrete realities."

In outlining that body's current policy, he explained that scientific research, the training of professional workers and the uses of nuclear energy for peaceful purposes, such as their application in medicine and industrial development, "should be regarded from now on as priority aspects of our administration."

He commented on the current situation in the development of atomic energy in Argentina and its future prospects on the day after the main sessions commemorating the 35th anniversary of the founding of the CNEA were held in this city, coinciding with National Atomic Energy Day and the 30th anniversary of the founding of the Balseiro Institute. President Raul Alfonsin attended the ceremonies.

Costantini admitted that the delay in the approval of the budget for this year is having a negative effect on the continuation of the projects undertaken by the CNEA, because of their high financial cost.

"We hope," he went on to add, "that nuclear energy will not become a factor in state power, but that it will instead be placed in the service of mankind." He noted by way of example the application of radioisotopes in medicine, biology and genetics.

No Consensus

He went on to explain that the presence of his Latin American colleagues at the ceremonies held at the Bariloche Atomic Center "should be regarded as a regional reaffirmation of the peaceful uses of atomic energy," despite the fact that the delegates were not able to reach agreement on a document to be signed to this effect.

On the other hand, some representatives regarded Costantini's meeting with the heads of other Latin American nuclear commissions as really being a kind of preparatory session for the scheduled November meeting of the Inter-American Nuclear Energy Committee, a body under the jurisdiction of the OAS. In answer to a question, Costantini said that both with regard to the nuclear power plants, "which are today providing about 11 percent of our domestic electrical production," and the fuel cycle, the advances will be limited "for the time being to the realm of concrete reality."

5157

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ARGENTINA

BRIBERY CHARGE RELATED TO NUCLEAR REACTOR SAID CONFIRMED

Buenos Aires CLARIN in Spanish 13 Jun 85 p 25

[Text] The head of the National Administrative Investigations Supervisory Board, Ricardo Molinas, has obtained evidence from Swiss banks, with the assistance of the court system in that country, proving the payment of \$4 million to the late Jose Gelbard, who served as minister of economy under Hector Campora and Juan Peron, by foreign enterprises interested in the installation of a nuclear reactor at the Rio Tercero reservoir in the province of Cordoba, which occurred in 1973.

Molinas issued a statement entitled "A Serious Transaction Clarified" yesterday, in which he stated that Italimpianti, an Italian enterprise, and Atomic Energy of Canada Limited, a Canadian enterprise, paid that sum into the Opera account established by Gelbard at the Trade Development Bank in Geneva. These funds were later transferred to other personal accounts maintained by this official.

The evidence mentioned by Molinas was obtained thanks to the timely investigation launched by the body he heads during the administration of Sadi Conrado Massue, and headed by Deputy Prosecutor Antonio Luis Beruti, into the irregular payment to third persons of a substantial "commission," which at the time led to a parliamentary investigation in Canada.

According to the document released by Prosecutor Molinas, the matter ended in the obtaining of specific information from the Swiss bank concerning the ownership of the account in which these funds were deposited.

Molinas said that the records of judicial proceedings by the Swiss state were obtained through the Foreign Ministry in connection with Case No 3693, currently being handled by Federal Judge Miguel Pons, to whom it was turned over by the National Administrative Investigations Supervisory Board.

The Swiss Republic and the Canton of Geneva definitely confirmed the ownership of the Opera account at the Trade Development Bank in Geneva, to which the greater part of the funds paid out by the supply enterprises Italimpianti and Atomic Energy of Canada Limited was deposited.

The prosecutor added that "the long and persistent efforts pursued by the federal court and this supervisory board, in which connection they had the needed support of our Ministry of Foreign Relations, fully confirmed the suspicion of graft, in which connection the board will initiate court proceedings.

As a result of the reports received in July of 1983, the statement released goes on to say, charges were filed in a court of the first instance in the city of Geneva, which handed down a judgment in favor of the petition by the Argentine court authorities.

After various appeals filed by the heirs to the account holder, now deceased, had been heard, the court in Lausanne, Switzerland, made a final ruling on the case, ordering that the information requested be provided.

According to the records on the case, Molinas went on to say, Jose Gelbard established a regular account identified as "Opera" at the Trade Development Bank on 24 November 1972, and maintained that account until 23 September 1976.

On 2 May 1974, the sum of US\$2.5 million was transferred to that account from the Swiss-Italian Bank in Lugano, and a little later, on 27 May, another US\$1.2 million was transferred to the account from the Italian Commercial Bank in Genoa, on the orders of Italimpianti, in connection with the expenditures pertaining to the nuclear power plant in Cordoba.

On 26 March 1976, finally, the Opera account was credited with US\$300,000, also transferred from the Swiss-Italian Bank. Molinas added that "in accordance with the instructions of said Jose Ber Gelbard," the funds in question "were transferred from the Opera account to Account No 24777/AB, which Gelbard had established at the Trade Development Bank 2 years earlier.

This latter account was closed on 30 September 1974, the balance being transferred to a new account known as "Gidul," in the name of Jose Gelbard and members of his family. That account, in turn, was closed on 9 April 1976, the prosecutor said.

5157
CSO: 5100/2134

ARGENTINA

'SMALL' NUCLEAR POWER CENTER PLANNED IN CORDOBA

PY210002 Buenos Aires TELAM in Spanish 0054 GMT 28 Jul 85

[Text] Cordoba, 17 Jul (TELAM) -- National Atomic Energy Commission (CNEA) President Alberto Costantini announced here tonight that the CNEA has decided to build a small nuclear power center in Embalse, 110 km south of this city. The center will comprise two plants, which will produce cobalt-60 and radioisotopes, and a 15-mw reactor, and will cost approximately \$40 million. This important project will be supplemented by the laboratories and the infrastructure necessary for this type of plant, which will be similar to CNEA centers in Ezeiza, Constituyentes, and Bariloche, he said.

Costantini released this information at a press conference during a meeting at Government House. The meeting was attended by Provincial Governor Eduardo Cesar Angeloz, provincial government officials, and CNEA technicians.

Costantini said the CNEA decided to build the center in Cordoba not only because of the governor's considerable efforts to have it built in his own province, but also because of the importance the local industry has given to quality control processes, particularly in the aircraft and automobile industries.

He added that the CNEA has also taken into account the high quality of the local university, and said the CNEA will grant scholarships to professionals wishing to specialize in nuclear science at CNEA's Balseiro Institute, in Bariloche.

The technicians who developed the so-called Cobalt-60 Project reported the technical details. They said the center will manufacture sealed source material for internal consumption and for export. By the end of the third year, the income generated by sales of this material will have returned the initial investment, they said.

As for the radioisotope production reactor, they reported that it will produce material for medical and industrial use, and that it will be used to separate primary radioisotopes and carry out nuclear and biological control processes.

After explaining that the center will be built in the vicinity of the Embalse Nuclear Plant, the technicians said the implementation of the project might begin by the end of the year and that its completion would take approximately 5 years. They pointed out that it will be financed with the CNEA's own resources.

CSO: 5100/2146

ARGENTINA

BRIEFS

CNEA RESIGNATIONS--Buenos Aires, 23 Jul (NA)--It was learned today from reliable sources that two directors, a manager, and a specialist in nuclear plants, in addition to researchers and technicians, have in recent weeks resigned their posts at the National Atomic Energy Commission [CNEA] and most of them have left the country to seek better job opportunities. Among the most recent resignations at the CNEA are those of Jorge Bertoni, director for nuclear plants, who went to work abroad; and that of Alejandro Placer, director for planning, coordination, and control, who was hired by the International Atomic Energy Agency (IAEA) to work in its Vienna headquarters. Jorge Coll, former president of the Argentine Nuclear Enterprise for Electrical Power Plants (ENACE), which is subordinate to the CNEA, has also resigned and joined the IAEA. The resignation of Aristides Dominquez as manager for human resources stands out among other resignations reported at the CNEA in recent weeks. The CNEA faced a crisis in August 1984, when most of its directors tendered their resignations to CNEA President Alberto Constantini, who did not accept them. The departure from the country of CNEA experts is taking place at a time when the government is making efforts to repatriate Argentine scientists residing abroad. [Text] [Buenos Aires NOTICIAS ARGENTINAS in Spanish 2050 GMT 23 Jul 85 PY]

LAPENA ON NUCLEAR ENERGY--Buenos Aires, 23 Jul (NA)--Jorge Lapena, under secretary for energy planning, today stated that "nuclear energy will not play a major role in the production of electricity in the next 20 years," and admitted that "there is now an oversupply of electricity as a result of the drop experienced by the Argentine gross domestic product [GDP] in the past decade." Lapena made this statement in a luncheon given by the Petroleum Club at the Plaza Hotel. The luncheon was attended by Shell Vice President Paez Allende, Esso Vice President German Salazar, Bridas representative Alejandro Bulgheroni, and others. Lapena said the drop in the demand for electricity "stems from the zero growth of the Argentine GDP during the past decade due to a regression of the Argentine economy." Lapena said that at present hydroelectrical power accounts for 45 percent of the national power resources and that nuclear plants only supply 11.5 percent of the electricity used in the nation. He announced that natural gas will have to be used in the future for the production of electricity. Lapena noted that "there is now a short supply of gas due to our inadequate pipeline systems," and that there was a 5 percent drop in the production of oil during the first half of 1985 compared to the same period of 1984. In this regard, Lapena said that "the level

of oil reserves remains unchanged" and warned that "if a serious effort is not made in this sector, Argentina will no longer be able to have sufficient oil for its own consumption." [Excerpt] [Buenos Aires NOTICIAS ARGENTINAS in Spanish 2008 GMT 23 Jul 85 PY]

NUCLEAR SCIENTISTS' EXODUS DENIED--Buenos Aires, 24 Jul (TELAM)--The National Atomic Energy Commission [CNEA] today denied press reports that two CNEA directors have decided to leave the country in an alleged exodus. The CNEA reported that the two scientists are enjoying a leave without pay to work for the International Atomic Energy Agency, a normal activity. In a communique, the CNEA stated that proof of this is the recent return to the country of an Argentine expert, who now holds the post of director of planning, coordination, and control. Moreover, these scientists had already spent lengthy periods abroad, either on missions or contracts authorized by previous governments. The CNEA adds that hundreds of scientists and technicians are abroad updating and increasing their knowledge and providing their expertise and experience to the country through this commission, without accepting posts in nuclear organizations of other countries, thus maintaining and increasing the outstanding Argentine position in the nuclear field. The CNEA communique concluded by saying that a similar situation is occurring with an expert in chemistry and a CNEA director. [Text] [Buenos Aires TELAM in Spanish 0514 GMT 24 Jul 85 PY]

CSO: 5100/2149

BRAZIL

COMMENTATOR VIEWS REAGAN-GORBACHEV MEETING

PY100345 Sao Paulo Radio Bandeirantes Network in Portuguese 0230 GMT
10 Jul 85

[Commentary by Newton Carlos]

[Text] There are great expectations throughout the world, but especially in Europe and the United States, regarding the preparations for the summit conference between U.S. President Ronald Reagan and the new Soviet leader Mikhail Gorbachev.

This conference will be held in November, but Gorbachev's strategy has already been established. He will reportedly try to convince Reagan that the detente experience of the 1970's must be exploited, not only to establish detente, but to make it more dynamic and to have it function as an instrument capable of changing a world armed to the teeth into an international security system.

However, the Soviets have imposed a condition: Strategic balance must prevail. Both Soviet and U.S. arsenals should have equal destructive power. This is the main reason for the Soviets to demand that the U.S. star war program be pigeonholed. They claim that this program is destabilizing, and that it upsets the strategic balance achieved with great sacrifice by the Soviets.

CSO: 5100/2142

BRAZIL

PUGWASH MEETING CABLES SARNEY, REAGAN, GORBACHEV

PY112143 Rio de Janeiro O GLOBO in Portuguese 10 Jul 85 p 19

[Text] Campinas, Sao Paulo--Hundred scientists from 60 countries who participated in the week-long 35th meeting of the Pugwash Movement have sent a telegram to President Jose Sarney suggesting that Brazil and Argentina sign a pact restricting nuclear development in Latin America, and that all countries of the continent support the Tlatelolco Treaty. The scientists also sent telegrams to U.S. President Ronald Reagan, and to CPSU Central Committee General Secretary Mikhail Gorbachev asking them to examine at their November summit not only the problems that affect the two major powers in particular, but also those that affect all the continents.

Copies of the document written at the Pugwash Movement meeting are being mailed to Sarney, Reagan, and Gorbachev. In the document, the scientists question the proliferation of nuclear weapons, the arms race in Latin America, the foreign debt as a factor of social and political instability, the Malvinas issue, and the problems in southern Africa.

CSO: 5100/2142

BRAZIL

FRG MINISTER URGES CONSTRUCTION OF SECOND NUCLEAR PLANT

LD270909 Hamburg DPA in German 2239 GMT 26 Jul 85

[Excerpts] Sao Paulo, 26 Jul (DPA) -- Federal Minister for Economic Cooperation Juergen Warnke has called on Brazil to change its protective policy on the information technology industry. At the end of his 4-day visit to Brazil today, Warnke described the protective measures to the press in Sao Paulo as a mistaken legislative decision. He hoped Brazil would amend it. The law on information technology forbids foreign firms from producing microelectronics products in Brazil.

Warnke said the law on information technology hampered new German investment in Brazil. In order to bring foreign investment to Brazil the country should also make it clear that it intends to pay its debts. Warnke suggested to the Brazilians that not just one, but two, nuclear power stations should be set up in cooperation with German industry. Until now it was only certain that the Brazilian Government would complete one German nuclear power station (Angra Two). The German-Brazilian nuclear treaty concluded in 1975 originally planned for the construction of eight German nuclear power stations. Due to its economic and financial crisis however, Brazil has no more money to carry out these plans. Warnke flew from Sao Paulo to Peru for a several-day visit.

CSO: 5100/2155

BRAZIL

GOVERNMENT TO REVIEW NUCLEAR AGREEMENT WITH FRG

PY160236 Rio de Janeiro O GLOBO in Portuguese 12 Jul 85 p 17

[Text] Mines and Energy Minister Aureliano Chavez yesterday announced that the Brazilian nuclear program and the construction of more than five nuclear plants, established in an agreement with the FRG, will be reviewed by a high-level commission made up of representatives of the government and the Brazilian scientific community.

After meeting with President Jose Sarney at Planalto Palace, Aureliano Chavez reported that the nuclear program will be reexamined in view of the country's economic situation.

The commission, to be established in the next few days, will be coordinated by the Mines and Energy Ministry and will have 120 days to make the study. According to the mines and energy minister, one point has already been decided: The investment in the nuclear program will be reduced but the Angra II and III nuclear plants must be concluded.

CSO: 5100/2143

BRAZIL

SETUBAL QUESTIONS USSR'S NUCLEAR TEST SUSPENSION

PY302336 Paris AFP in Spanish 2205 GMT 30 Jul 85

[Text] Brasilia, 30 Jul (AFP) -- Brazilian Foreign Minister Olavo Setubal today expressed an implicit doubt regarding the suspension of nuclear tests proposed by the USSR, because there is a lack of knowledge regarding the effects of the explosions that are carried out for peaceful purposes. Setubal granted a press conference today, upon arriving at the Brasilia Air Force Base on his return from Lima, where he participated in the inaugural ceremonies of the new Peruvian president, Alan Garcia.

Mikhail Gorbachev, the secretary general of the USSR Communist Party, has announced a unilateral suspension of nuclear tests as of 6 August 1985 and has invited the United States to adopt a similar position. The United States has rejected the Soviet offer.

Setubal believes that the measure must be studied from a technical viewpoint. At this time, and without consulting experts, I cannot say whether that measure will contribute to the peaceful development of nuclear energy, Setubal added.

Brazil has not adhered to the Non-Proliferation of Nuclear Arms Treaty because it considers it to be discriminatory, but has signed the Tlatelolco Treaty that denuclearizes Latin America, although Brazil has not yet ratified it.

The foreign minister highlighted President Francois Mitterrand's reply to a letter that was addressed to all the chiefs of state of industrialized nations by Uruguayan Foreign Minister Enrique Iglesias in his role as secretary pro tempore of the Cartagena Consensus. In the letter Iglesias asks for the understanding of the industrialized nations regarding the economic problems of Latin America. The French president's answer was one of understanding, Setubal said. The other answers were conventional.

Setubal also indicated that Argentina, Brazil, Peru, and Uruguay have offered more cooperation to the Contadora Group and its efforts to achieve peace in Latin America.

CSO: 5100/2155

BRAZIL

URANIUM TO BE ENRICHED BY JET-NOZZLE PROCESS BY 1989

PY311814 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 24 Jul 85 p 21

[Text] Rio de Janeiro -- Nuclebras president Licinio Seabra stated yesterday that by early 1989, Brazil will be in a position to enrich uranium through the jet-nozzle process, and will then be able to assess the country's interest, taking into account that this is the most expensive process.

After lecturing to officers of the Naval War School, Seabra stated that NUCLEI [Nuclebras Isotope Enrichment, Inc.], a Nuclebras subsidiary, "is mounting the first pilot cascade which is already being mounted on an industrial scale, so as to assess the performance of the jet-nozzle process for enriching uranium isotopes."

"This is the first stage of the pilot plant. We are in the final stage of that plant, which will begin operating in the second half of 1986. Then we will have an observation period of 1 or 1 1/2 years, in order to be able to make an assessment afterwards of all the aspects of the operations system," Seabra added.

He admitted that the "jet-nozzle process is the most advanced system for the enrichment of uranium, but it is more expensive than the other two systems available today in those countries that have already obtained the enrichment process." According to Seabra, the countries that have it "do not want to transfer them to Brazil or other countries."

The Nuclebras president added that should a decision be made to install the enrichment process at industrial level, a period of 3 years would be needed for the production of enriched uranium and for other investments.

"But this is a decision that has not yet been made and it will depend on a strategic assessment that could be made upon the conclusion of the first stage of the pilot plant, which could take place by the end of 1988 or the beginning of 1989," Seabra stated.

Without taking a position for or against the continuation of the nuclear plant Angra III, (it has been paralyzed), the Nuclebras president stated that \$500 million were already invested in that project.

Seabra added that he has kept the copy to O ESTADO DE SAO PAULO to read the report in which the German magazine DER SPIEGEL reports that the nuclear agreement

signed by Brazil 10 years ago with the FRG resulted "in nothing for Brazil," and that he is going to read it at night. He said that the agreement already allowed for the training of Brazilian experts, whether engineers or technicians, and cited NUCLEP [Nuclebras Heavy Equipment, Inc.], another subsidiary of Nuclebras, as one of the positive results of the agreement. He also cited the fact that NUCLEP has own the bid for the construction of Argentina's Atucha, Nuclear Plant and NUCLEP's participation in the bids called for by Egypt and Turkey for the production of nuclear reactions in association with the German Kraftwerk Union.

CSO: 5100/2158/F

BRAZIL

ANNUAL REPORT OF IPT OF SAO PAULO

Sao Paulo GAZETA MERCANTIL in Portuguese 22 Apr 85 p 27

[Text] Sao Paulo Institute of Technological Research, S. A. (IPT)

Board of Directors: Milton Vargas, president; Victor Manoel de Souza Lima, vice president; Talmir Canuto Costa, Aerospace Technical Center, Ministry of Air; Naval Commander Jorge Pinheiro da Costa Veiga, Naval Engineering Board, Ministry of Navy; Hessel Horacio Cherkasski, Secretariat of Industry, Commerce, Science and Technology; Jose Ephim Mindlin, Sao Paulo State Federation of Industry; Saul Goncalves d'Avilla, Secretariat of Industry, Commerce, Science and Technology; Plinio Oswaldo Assmann, Engineering Institute; Walter Borzani, State Science and Technology Council; Jose Rossi Junior, Secretariat of Industry, Commerce, Science and Technology; Celso Pinto Ferraz, Secretariat of Industry, Commerce, Science and Technology; and Clovis Bradaschia, University of Sao Paulo Polytechnical School.

Supervisory Board: Vilmar Evangelista Faria, Eduardo Pinheiro Gondin Vasconcelos, and Luis Antonio Siquiera Reis Dias.

Executive Board: Dr Milton Vargas, president; Dr Victor Manoel de Souza Lima, vice president; Dr Alberto Pereira de Castro, superintendent; Dr Carlos de Souza Pinto; and Dr Paulo Cesar Leone.

Message to the Stockholders and the Public

In 1984, the attention of the Executive Board of the IPT was focused on the maintenance of the human and material assets of the institute, for the purpose of safeguarding them with a view to more effective technological support of Brazilian industry in this developing phase.

At the end of the year, the IPT had 746 researchers, 1,038 technicians, 694 administrative employees and 208 assistants, making a total of 2,686 permanent employees, 1,120 of them with university level education.

During the year, 26 completed their masters programs and six obtained doctorates, such that by the end of the year 172 technicians had postgraduate training. The apprenticeship program accepted 432 university students.

However, the IPT lost 50 university-level technicians, basically for salary reasons, and fears the loss of some others. This development has weakened its chief asset, which took years to train and has cost the institute and state so much.

In accordance with State Law 3741, the employee participation system was established, such that this group has a representative on the board.

As to the physical assets, the investment of resources continued to be limited, falling far below the minimal requirements and even threatening the maintenance of some laboratories. The total expenditures came to 2,649,000,000 cruzeiros, including state subsidies and specific financing, mainly from the FINEP [Funding Authority for Studies and Projects].

Despite the recessive atmosphere, the IPT received contracts for the execution of 354 new projects, and at the end of the year, it had 455 projects under way, in addition to having completed thousands of tests and analyses in its 89 laboratories.

The income obtained from services rendered came to 30.6 billion cruzeiros. Of this total, 15 percent pertained to services rendered to the Secretariat of Industry, Science, Commerce and Technology (SICCT), 14 percent to services rendered to other state administrative bodies, 32 percent to services rendered to federal administrative bodies, 2 percent to services rendered to municipal administrations, 2 percent to services rendered to the bodies of other states in the federation, 30.5 percent to services rendered to private enterprise, and 3.5 percent to minor and miscellaneous services. Thus a percentage increase in contracts with private bodies was noted, since in earlier years they accounted for 20 percent of the income.

The SICCT projects were focused on the priorities of that body, in connection with domestic technology for enterprises, support of micro, small and average enterprises, support of the municipalities, alternative energy sources and development of the mineral sector.

Among the projects carried out for Sao Paulo state government bodies, special mention is merited by those done for the CESP [Sao Paulo Electric Power Plants, Inc.], ELETROPAULO, SABESP, DER [Highway Department], DAEE [Water and Electric Power Department] and METRO. Important work for the federal government included that done for PETROBRAS [Brazilian Petroleum Corporation], PETROMISA, Rio Doce Valley Company, RFFSA, ALBRAS [Brazilian Aluminum, Inc.], EBTU [Brazilian Urban Transportation Company], COSIPA [Sao Paulo Iron and Steel Company], ELETRONORTE [Northern Electric Power Plants], NUCLEBRAS [Brazilian Nuclear Corporations, Inc.], NBH [National Housing Bank], IBDF [Brazilian Forestry Development Institute], SUDHEVEA [Superintendency of the Rubber Industry], EMBRATEL [Brazilian Telecommunications Company], EMBRAPA [Brazilian Agriculture and Livestock Research Enterprise, the Ministries of Navy, Army and Air, and the FINEP. This latter agency has confirmed its position as the main financer of IPT projects, with nine contracts. Outstanding among these are the work pertaining to the Program for Aid to Industry in Energy Conservation, with the participation of the National Council for Petroleum and the FIESP [Sao Paulo State Federation of

Industries], and, with PME-FINEP resources, continuation of the babacu palm development project at the Teresina experimental unit in Piaui. The IPT projects also obtained financial support from the STI [Secretariat for Industrial Technology]-MIC [Ministry of Industry and Commerce], the FIPEC of the Bank of Brazil and the PADCT [Support Program for Scientific and Technological Development], and, in the international sector, from the Itamaraty Palace, the SUBIN and the FUNDAP.

For the municipal government, projects involving low-cost paving, soil use, assessment of housing complexes, hydraulic earth-filling and the use of reforestation woods for low-cost housing were carried out. Projects for other state governments were executed in Parana, Rio de Janeiro and Goias, in addition to other services rendered in various regions of Brazil.

In the private sector, the work done was focused on three main areas: nationalization of equipment, components and materials, development projects, and technological support. Notable work was done in blast welding, precision casting, the production of metal powders and parts of aluminum oxide and aluminous porcelain, the production of odometers, extra-soft steel, cast iron parts with a high silicon content, wood processing, instrumentation equipment, the use of niobium in alloys, description of magnetite rejection, the uses of aluminum in medium-sized vessels, the handling of propellants, off-shore platforms, continuous biodigestion, rust-resistant materials, tempering glass, microcomputer hardware, the development of catalysts, geotechnics, the monitoring of drilling and setting of stakes, the cementing of oil wells, the testing of railroad parts and various tests on metals. With the participation of the INPI [National Institute of Industrial Property], the development contracts with Eternit and Sama were continued, and a similar contract was signed with Pirelli.

Also in 1984, the institute published 34 periodicals and 246 serial publications. It organized nine seminars and symposiums in which about 700 individuals participated. The Specifications Section received about 19,000 inquiries concerning its archive of about 230,000 technical norms, and, finally, the library received 7500 requests for information from businesses interested in subjects related to technology. The institute applied for 11 new patents and another three were granted by the INPI, all of them pertaining to technological innovation projects.

As to the economic and financial aspect, the operational results for 1984 can be summarized in the following figures:

	<u>Millions of Cruzeiros</u>
Net recorded operational income	38,943
Subsidy from state government	29,823
Net recorded operational expenditures	75,695
Operational deficit	6,927

If the expenditures of the Paulipetro Consortium, totaling 8,315,000,000 cruzeiros, are deducted, and a comparison is made with the past 2 years, we have:

	Millions of Cruzeiros		
	<u>1982</u>	<u>1983</u>	<u>1984</u>
Own income	9,726	14,414	30,628
State subsidy	4,006	9,743	29,823
Operational expenditures	14,142	26,927	67,380

With the deduction of 3.94 billion cruzeiros for depreciation, in accordance with the model established by the Board of Directors, it will be seen that the institute's own income covered 40 percent of the operational expenditures for the year 1984.

The balance statement also contains figures pertaining to Paulipetro, and with those figures deducted, we have the following:

	Millions of Cruzeiros	
	<u>1983</u>	<u>1984</u>
Current assets--accounts receivable	2,824	6,193
Current liabilities--suppliers	1,409	4,136

The economic situation of the IPT is expressed below in the index of current liquidity (current assets in relation to current liabilities) and the index of indebtedness (total owed in relation to net assets). To allow a better assessment of the accounts, these indices are also shown in terms of the adjusted figures, which exclude the sums pertaining to Paulipetro.

	<u>1983</u>	<u>1984</u>
Current Liquidity Index		
--with total figures	0.61	0.47
--with adjusted figures	0.40	0.39
Index of Indebtedness		
--with total figures	3.37	1.55
--with adjusted figures	2.72	1.10

BALANCE STATEMENT AS OF 31 DECEMBER 1984 AND 1983
 (in thousands of cruzeiros)

	Assets	
	<u>1984</u>	<u>1983</u>
Current		
Cash bank funds	1,488,568	931,636
Accounts receivable	12,577,816	11,524,828
Special and compulsory deposits	179,251	84,222
Stocks	588,159	165,370
Advance payments	2,659	8,290
	<u>14,836,453</u>	<u>12,714,346</u>
Long-term		
Special and compulsory deposits	454,689	152,572
	<u>454,689</u>	<u>152,572</u>
Permanent		
Investments	103,581	30,186
Fixed	100,034,705	32,259,433
	<u>100,138,286</u>	<u>32,289,619</u>
	<u>115,429,428</u>	<u>45,156,537</u>
	Liabilities	
	<u>1984</u>	<u>1983</u>
Current		
Suppliers	7,918,458	8,101,848
Loans and financing	6,402,775	2,290,944
Wages and contributions	5,245,044	4,076,111
Provision for general expenditures	2,744,920	1,465,458
Customers' advance payments	2,062,294	666,862
Provisions for wages and taxes	4,973,933	1,791,598
Provisions for interest and correction on loans	1,358,693	1,744,400
Other accounts payable	547,758	389,585
	<u>31,253,875</u>	<u>20,526,806</u>
Long-term		
Loans and financing	38,526,246	14,083,198
Other accounts payable	519,359	228,915
	<u>39,045,605</u>	<u>14,312,113</u>
Net assets		
Capital	35,504,600	13,516,947
Capital reserves	78,736,471	21,895,779
Cumulative losses	(91,451,626)	(25,918,094)
	22,789,445	9,494,632
State allocation for increasing capital	22,340,503	822,986
	<u>45,129,948</u>	<u>10,317,618</u>
	<u>115,429,428</u>	<u>45,156,537</u>

Appended explanatory notes are an integral part of the financial statements.

**Statement of Changes in Liquid Assets as of the Fiscal Years
Ending 31 December 1984 and 1983 (in thousands of cruzeiros)**

	Capital Reserves				
	<u>Capital</u>	<u>Monetary Adjustment on Capital</u>	<u>Allocation for Investment</u>	<u>Special Monetary Correction</u>	<u>Total</u>
31 Dec 1982 balance	6,127,816	5,990,771	16,786	268,158	6,275,715
Increase in capital	7,389,131	(5,990,770)	--	--	(5,990,770)
State allocation for future increase in capital	--	--	--	--	--
Compensation for cumulative losses	--	--	--	--	--
Monetary correction on net assets	--	21,164,667	26,285	419,882	21,610,834
Losses for the period	--	--	--	--	--
31 Dec 1983 balance	13,516,947	21,164,668	43,071	688,040	21,895,779
Increase in capital	21,987,653	(21,164,667)	--	--	(21,164,667)
State allocation for future increase in capital	--	--	--	--	--
Monetary correction on net assets		76,431,482	92,719	1,481,158	78,005,359
Losses for the period	--	--	--	--	--
31 Dec 1984 balance	<u>35,504,600</u>	<u>76,431,483</u>	<u>135,790</u>	<u>2,169,198</u>	<u>78,736,471</u>

	Adjusted Net Assets of the Self-Governing Body				<u>Total</u>
	<u>Governing Body</u>	<u>Cumulative Losses</u>	<u>State Allocation</u>		
31 Dec 1982 balance	368,184	(6,355,217)	1,398,361		7,834,859
Increase in capital	--	--	(1,398,361)		--
State allocation for future increase in capital	--	--	509,329		509,329
Compensation for cumulative losses	(704,985)	704,985	--		--
Monetary correction on net assets	316,801	(9,673,936)	313,657	12,567,356	
Losses for the period	--	(10,593,926)	--	(10,593,926)	
31 Dec 1983 balance	--	(25,918,094)	(822,986)	10,317,618	
Increase in capital	--	--	(822,986)	--	
State allocation for future increase in capital	--	--	18,044,220	18,044,220	
Monetary correction on net assets	--	(55,794,422)	4,296,283	26,507,220	
Losses for the period	--	(9,739,110)	--	(9,739,110)	
31 Dec 1984 balance	--	<u>(91,451,626)</u>	<u>22,340,503</u>	<u>45,129,948</u>	

Appended explanatory notes are an integral part of the financial statements.

Explanatory Notes for the 31 December 1984 Financial Statements

Note 1--Summary of the Main Accounting Practices

The financial statements are drafted and presented in accordance with the provisions set forth in Law No 6404/76 and the tax legislation in effect.

The effects of inflation on the financial statements are incorporated by means of the monetary correction shown on the records of the permanent and net assets, in which the state allocation for a future increase in capital is included, such that the net result of these corrections is incorporated in the results for the period.

The other assets and liabilities requiring correction or adjustment because of exchange variations are also corrected, and in the same way, the respective results are integrally incorporated in the statement of the results for the period.

The provision for uncollectible debts was established on the basis of an individual analysis of the credit sums owed, and is regarded as adequate to cover possible losses.

Stocks are shown at average purchase cost, which is lower than replacement cost.

Fixed assets are shown at corrected cost. Depreciation is calculated by the linear method, using the maximal rates allowed by the fiscal legislation, except for buildings, to which the rate of 2 percent per year is applied.

Note 2--Accounts Receivable

	<u>1984</u> In Thousands of Cruzeiros	<u>1983</u> In Thousands of Cruzeiros
Customers	10,182,878	9,960,509
Minus:		
Provision for uncollectible debts	384,804	230,216
Expected invoicing	<u>239,635</u>	<u>88,665</u>
	9,558,439	9,641,628
Receipts to be billed	2,473,324	1,192,523
Subsidy from state government	--	399,650
Other accounts receivable	<u>546,053</u>	<u>291,027</u>
	<u>12,577,816</u>	<u>11,524,828</u>

Note 3--Fixed Assets

(in thousands of cruzeiros)

	<u>Corrected Cost</u>		<u>Cumulative Depreciation</u>		<u>Net</u>	
	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>
(1)	25,384,872	8,051,735	--	--	25,384,872	8,051,735
(2)	37,796,715	11,056,326	4,641,355	1,236,307	33,155,360	9,820,019
(3)	42,625,641	11,756,775	23,124,359	5,987,947	19,501,282	5,768,828
(4)	7,119,130	1,113,699	2,326,028	535,211	4,793,102	578,488
(5)	4,828,781	1,489,900	2,941,377	784,542	1,887,404	705,358
(6)	1,228,258	763,851	--	--	1,228,258	763,851
(7)	<u>16,532,567</u>	<u>7,221,133</u>	<u>2,448,140</u>	<u>649,979</u>	<u>14,084,427</u>	<u>6,571,154</u>
	<u><u>135,515,964</u></u>	<u><u>41,453,419</u></u>	<u><u>35,481,259</u></u>	<u><u>9,193,986</u></u>	<u><u>100,034,705</u></u>	<u><u>32,259,433</u></u>

Key:

- | | |
|--------------------------------------|--------------------------|
| 1. Land | 4. Installations |
| 2. Structures | 5. Furnishings and tools |
| 3. Machinery, parts
and equipment | 6. Work in progress |
| | 7. Other |

Note 4--Loans and Financing

	<u>1984</u>	<u>1983</u>	<u>Annual Obligations</u>	<u>Form of Amortization</u>	<u>Due Date</u>
	<u>In Thousands of Cruzeiros</u>				
Domestic					
BADESP*	6,746	9,199	4% + 40% ORTN**	Quarterly	1987
FINEP	1,733,623	750,267	2% to 12%***	Monthly and Quarterly	1996
Bank of Brazil	<u>110,366</u>	<u>78,098</u>	<u>18%</u>	Annual	1989
	<u><u>1,850,735</u></u>	<u><u>837,564</u></u>			
Foreign					
BID*****/FINEP (\$4,894,200 in in 1984 and \$5,438,000 in 1983)	15,583,133	5,350,992	3%	Semiannual	1993
BID-FINEP- CEFER (\$2,547,412 in 1984 and \$2,751,205 in 1983)	8,110,961	2,707,186	8.6%	Semiannual	1997

	<u>1984</u> <u>In Thousands of Cruzeiros</u>	<u>1983</u>	<u>Annual Obligations</u>	<u>Form of Amortization</u>	<u>Due Date</u>
BANESPA (\$1,336,000)	4,253,824	1,958,000	libor + 1.75%	Semiannual	1988
BANESPA (\$416,000)	--	409,344	libor + 2.25%	One time	1984
BANESPA (\$4,752,000)	<u>15,130,368</u> <u>43,078,286</u> <u>44,929,021</u>	<u>5,101,056</u> <u>15,536,578</u> <u>16,374,142</u>	libor + 2.25%	Semiannual	1990

- * Sao Paulo State Development Bank
- ** National Treasury Readjustable Bonds
- *** Monetary correction = 10 percent to 60 percent of the ORTN
- **** Inter-American Development Bank

	Domestic		Foreign		Total	
	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>
Short-term	214,375	67,505	6,188,400	2,223,439	6,402,775	2,290,944
Long-Term	<u>1,636,360</u> <u>1,850,735</u>	<u>770,059</u> <u>837,564</u>	<u>36,889,886</u> <u>43,078,286</u>	<u>13,313,139</u> <u>15,536,578</u>	<u>38,526,246</u> <u>44,929,021</u>	<u>14,083,198</u> <u>16,374,142</u>

The loans and financing are guaranteed by the Sao Paulo State Treasury.

Note 5--Capital

The capital is distributed in 35,504,600,207 registered ordinary stocks (13,516,947,031 in 1983) with a nominal value of one cruzeiro each, of which 35,504,392,496 belong to the State Treasury (13,516,866,314 in 1983).

Note 6--Nonoperational-Financial Expenditures (Income)

These are presented in this accounting section because they are not factors included in the price of services rendered, but result from loans which will be paid out of specific future capital contributions.

Note 7--CESP-IPT Consortium Operations

In accordance with the agreement signed with the CESP on 7 December 1979, the CESP-IPT Consortium was established with a view to the provision of oil field prospecting, assessment and development services.

The operations of the consortium involving the direct participation of the IPT are shown in its financial statements. The expenditures resulting from these operations are reimbursed by the government of the state of Sao Paulo through the Secretariat of State for Industry, Commerce, Science and Technology.

On 5 May 1983, the operational activities of the consortium were halted. It is now engaged in negotiations with the suppliers and other creditors with a view to the settlement of accounts.

Sao Paulo, 20 February 1985

Engineer Alberto Pereira Castro, superintending director; Engineer Carlos Sousa Pinto, director; Engineer Paulo Cesar Leone, director; and Jose Roberto Pissiguelli, accountant (CRC 116,193-SP).

Statement of Account for the Periods Ending
31 December 1984 and 1983
(in thousands of cruzeiros)

	<u>1984</u>	<u>1983</u>
Gross operational income		
Services rendered	27,641,862	17,547,193
Product sales	3,359,232	1,149,407
Services rendered--SICCT	5,604,961	1,760,881
Other	<u>2,609,032</u>	<u>1,161,060</u>
	39,215,087	21,618,541
Less returns and discounts	271,710	49,607
Net operational income	38,943,377	21,568,934
Direct cost of services rendered and products sold	<u>49,357,746</u>	<u>25,436,373</u>
Operational margin	<u>(10,414,369)</u>	<u>(3,867,439)</u>
Operational Expenditures		
Personnel	20,547,635	7,595,373
Services of third parties	950,204	319,628
Depreciation (deductions of 3,305,681 cruzeiros in 1984 and 850,273 cruzeiros in 1983, on approximate cost)	634,221	318,836
Materials and supplies	1,112,564	393,437
Other	<u>3,093,242</u>	<u>1,043,177</u>
	<u>26,337,866</u>	<u>9,670,451</u>
Other income		
Budget economic allocations	29,823,883	10,767,731
Operational losses	<u>(6,928,352)</u>	<u>(2,770,159)</u>
Nonoperational financial expenditures		
(deductions of 21,604,424 cruzeiros in 1984 and 354,983 cruzeiros in 1983 from income)	(45,956,157)	(15,156,009)
Other	--	(26,994)
Monetary correction on permanent and net assets	<u>43,145,399</u>	<u>7,359,236</u>
Net losses for the period	<u>(9,739,110)</u>	<u>(10,593,926)</u>
Losses per share of company capital (calculated on the basis of the number of shares at the end of the period)	<u>0.03 cruz.</u>	<u>0.08 cruz.</u>

Appended explanatory notes are an integral part of the financial statements.

**Statement of Origin and Use of Resources for the Periods
Ending on 31 December 1984 and 1983
(in thousands of cruzeiros)**

	<u>1984</u>	<u>1983</u>
Origin of resources		
From shareholders		
State allocation for future increase in capital	18,044,220	509,329
From third parties		
Long-term financing and loans	296,030	559,001
Other	<u>6,582</u>	<u>20,973</u>
Total	<u>18,346,832</u>	<u>1,089,303</u>
Use of resources		
In operations		
Net losses for the period	9,739,110	10,593,926
Less charges not representing resources paid out:		
Depreciation of fixed assets	3,939,902	1,109,109
Exchange variations and monetary corrections on long-term debts	26,139,553	10,175,042
Plus income not representing resources acquired:		
Monetary correction on permanent and net assets	<u>43,145,399</u>	<u>7,359,236</u>
Other	<u>4,730</u>	<u>(3,724)</u>
	<u>22,809,784</u>	<u>6,605,287</u>
On permanent assets		
Purchase of fixed assets	<u>2,137,801</u>	<u>657,753</u>
For other purposes		
Liabilities transferred from long-term to current status	2,002,401	463,668
Increase in long-term prospects	<u>1,808</u>	<u>7,420</u>
	<u>2,004,209</u>	<u>471,088</u>
Total	<u>26,951,794</u>	<u>7,734,128</u>
Reduction in current capital	<u>8,604,962</u>	<u>6,644,825</u>

	<u>End 1984</u>	<u>End 1983</u>	<u>1983</u>	<u>Beginning</u>	
	<u>1984</u>	<u>1983</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>
Current assets	14,836,453	12,714,346	7,233,453	2,122,107	5,480,893
Current liabilities	<u>31,253,875</u>	<u>20,526,806</u>	<u>8,401,088</u>	<u>10,727,069</u>	<u>12,125,718</u>
Current capital	<u>16,417,422</u>	<u>7,812,460</u>	<u>1,167,635</u>	<u>8,604,962</u>	<u>6,644,825</u>

Appended explanatory notes are an integral part of the financial statements.

Opinion of the Supervisory Board

The members of the Supervisory Board of the Institute of Technological Research of the State of Sao Paulo, S.A. (IPT), pursuant to their legal and statutory authority, have examined the balance sheets, the pertinent

statements of results, the changes in net assets and the origin and use of resources, as well as the related explanatory notes, as of the close of 31 December 1984, set forth in accordance with generally accepted accounting principles. Based on this examination and an analysis of the monthly balance sheets, as well as the opinion of the independent auditors dated 20 February 1985, they believe that said statements adequately reflect the economic-financial-asset situation of the institute, in suitable condition for submission to and assessment by the shareholders.

Sao Paulo, 25 March 1985

Eduardo Pinheiro Gondim Vasconcelos
Luis Antonio Siqueira Reis Dias
Vilmar Evangelista Faria

Opinion of the Auditors

To the Directors of the Institute of Technological Research of the State of Sao Paulo, S. A. (IPT):

1. We have examined the balance statement of the Institute of Technological Research of the State of Sao Paulo, S. A. (IPT) struck as of 31 December 1984, and the related statements of results, the changes in net assets and the origin and use of the resources during the fiscal period ending on that date. Our examination was carried out in accordance with generally accepted auditing standards and, as a result, included verification of the accounting records and other auditing procedures we deemed necessary under the circumstances.
2. Earlier, we examined and issued our opinion on the financial statements for the fiscal period which ended on 31 December 1983, and these figures are submitted for purposes of comparison.
3. In our opinion, the financial statements to which the first paragraph refers adequately reflect the status of the assets and finances of the Institute of Technological Research of the State of Sao Paulo as of 31 December 1984, the results of its operations, the changes in its assets and the origin and use of its resources for the fiscal period ending on that date, based on generally accepted accounting principles applied in consistent fashion with regard to the preceding fiscal period.

Sao Paulo, 20 February 1985, Boucinhas, Campos and Claro, S.C. (CRC.SP-5,528),
Jose da Costa Boucinhas, accountant (CRC.SP-10).

5157
CSO: 5100/2127

BRAZIL

SARNEY ON FRG ACCORD, ARGENTINA'S NUCLEAR INTENTIONS

PY022156 Brasilia Domestic Service in Portuguese 1840 GMT 2 Jul 85

[Press conference by President Jose Sarney with foreign reporters at the Gloria Hotel in Rio de Janeiro--live]

[Excerpts] [Reporter] Mr President, the nuclear agreement between Brazil and the FRG was signed 10 years ago. The initial project foresaw the construction of eight nuclear plants by 1990. It now seems that none of those plants will be completed by that date. I would like to know the priority you will attach to that contract, specifically if your government will proceed with the construction of the second plant that is part of the contract with the FRG.

[Sarney] The Brazilian nuclear program and, within it, the part related to the contract with the FRG, is caught up in the difficulties that the country faces. Therefore, it will be subject to some strategy modifications.

At the same time, we are not in a position at this time to implement it. So it is included among those sectors in which we have to make quite substantial cuts.

[Pierre Guitaud, French television] The French Government has invited Brazil to participate in the Eureka project, and the same government praised the new Brazilian policy. At your invitation, President Mitterrand will visit Brazil. How would you like this visit to develop, basically from the political and economic standpoints?

[Sarney] The operation of the Eureka project is still a declaration of intent by some sectors of the French Government. We all know that the Eureka project is a peaceful response to the "star wars" initiative. We expect that the visit of President Mitterrand to Brazil will serve to bring our peoples closer together and, at the same time, will serve as an opportunity to discuss some problems of common interest between France and Brazil. One such area is the foreign debt problem, which we hope to clarify from the point of view of the European creditors, the Paris Club. It should also be an occasion to think over the problems of the world, Central America, world peace, and disarmament. Summing up, it should be an occasion to exchange opinions between two countries that want to state their mature position on international issues.

[Horacio Jimenez, ANSA] Mr President, through a parallel or secret nuclear program, Brazil could be developing technology to manufacture an atomic bomb, just like Argentina. Would this not be a case calling for serious talks between statesmen of the two countries to return to the peaceful use of nuclear energy, thus preventing enormous unproductive expenditures and new internal or external military adventures?

[Sarney] We do not believe that Argentina wants to manufacture the atomic bomb. We do not have any program to manufacture the atomic bomb either. Our interest in harnessing the technology of the atom is exclusively related to its peaceful uses. As we all know, Brazil is not a country rich in fossil fuels.

We need to have access to the technology of the atom so that we can be in a position to make our most industrialized regions independent of energy shortages in the short term. We are signatories of the Tlatelolco Treaty through which Brazil is committed to a nuclear-free Latin America. We do not want Latin America to be involved in any sort of nuclear weapons deployment. This is our position, and it will be maintained. Latin America has the privilege of being the only part of the planet that is free of nuclear arsenals. We wish it to stay free forever.

CSO: 5100/2156

BRAZIL

GOLDEMBERG CITES CAUSES, SOLUTIONS TO PROGRAM'S PROBLEMS

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 17 Jul 85 p 22

[Article by Jose Goldemberg: "The Agreement, 10 Years Later (1975-1985)"]

[Text] Launched 10 years ago as a project of great impact, capable of profoundly altering the course of Brazilian energy policy, as well as making us a great power, the nuclear program conducted by Nuclebras, based upon the agreement with West Germany, is now in ruins.

The Figueiredo government 4 years ago had already begun to lose interest in the program, initiating other activities of nuclear technology outside the Nuclebras program.

Now the Sarney government, in cutting funds for the Angra III (and other nuclear reactors), has given the coup de grace to a poorly formulated and poorly conducted program that led the scientific community--the only one that could have made it a success--to direct confrontation with the Geisel government since 1975, with negative consequences for the nation's scientific development.

Collapse of a program of such magnitude, which was to install eight 1200-megawatt nuclear reactors by 1990 and another 20 or 30 reactors in the 1990-2000 decade, is due mainly to the following reasons:

1. Incorrect evaluation of the role that nuclear energy should play in Brazil, which is amply endowed with hydroelectric resources, advantageous from all points of view: economic, technical and environmental. The forecasts that the nation would need eight large nuclear reactors in the year 1990 were clearly incorrect, as Itaipu (and other hydroelectric facilities) will supply the needed energy, at least until the end of this century. The success of Itaipu is probably the major economic reason for the collapse of the nuclear program, having diverted funds and prestige away from it.

2. Incorrect evaluation of the technology chosen for uranium enrichment, without which adoption of nuclear energy will only increase dependency on fuel imports. After 10 years and after spending about \$300 million, what was accomplished in the area of enrichment was a 24-stage pilot unit; should this pilot unit function satisfactorily--which seems unlikely--additional investments of about \$3 billion would be needed.

This is the main point raised by the scientists from the beginning against the nuclear agreement, as the technology chosen was already controversial in 1975. The government argued at the time that the Germans were forced by the Americans to abandon the initial offer of granting the (much superior) ultracentrifuge technology. This was and continues to be a fundamental question, and the Brazilian Government, for this reason, should have broken off negotiations with the FRG or created a domestic research group to develop its own technology--which in fact was done as of 1981.

3. Technical errors and unsatisfactory management that greatly increased the costs of the Angra dos Reis II power plant (the first of the plants bought from Germany). Total Nuclebras investments have been \$2.8 billion so far, plus a debt service of \$1.2 billion, for a total of \$4 billion, for which it has very little to show.

The main items for which these vast funds were spent are the following:

- Mineral exploration: \$150 million;
- Manufacture of uranium concentrate (at Poço de Caldas): \$260 million;
- Pilot enrichment plant: \$300 million;
- NUCLEP [Nuclebras Heavy Equipment, Inc] (heavy-equipment plant in Itaguaí): \$300 million;
- Nuclear fuel plant (Rezende): \$75 million;
- Technological training (for engineers): \$275 million.

The rest was spent in operating the company itself, which has about 5,200 employees, and on the expensive facilities of Angra II, the equipment for which has all been bought in Germany.

One of the items on this list that particularly catches the eye is the cost of technological training: throughout the 10 years of Nuclebras' life, a few hundred persons at the most were trained, which means that each one of these must have cost the public coffers almost \$1 million. This cost should be compared with what is spent on the National Council for Scientific and Technological Development [CNPq] to train the elite of the nation's researchers.

This is the result of 10 years of a grandiose project, that was characterized as such by the scientists of the SBPC [Brazilian Society for the Advancement of Science] at their 1975 meeting in Belo Horizonte.

According to its current president, Licinio Seabra, Nuclebras "lived in a world of fantasy (during these 10 years)."

How are we to leave this fantasy and try to solve the problems of the nuclear program created by Nuclebras?

One proposal discussed by President Tancredo Neves' COPAG [Committee for the Government Plan of Action] and that seems to have the support of the current Nuclebras management is a rapprochement with the electric sector (that is, ELETROBRAS [Brazilian Electric Power Companies, Inc.], with which Nuclebras tried to compete) and adoption of the French administrative model, which in Brazilian terms would be the following:

- Nuclebras would concentrate its efforts exclusively on the fuel cycle. The costs of installing the fuel cycle would be covered by a specific budget appropriation;
- The activities of nucleoelectric generation would remain in the electric sector, with an ELETROBRAS subsidiary being created for this specific and exclusive purpose. Angra I and II, as well as all the FURNAS [Furnas Power Companies, Inc] nuclear personnel, would be transferred to this company;
- NUCLEN [Nuclebras Engineering, Inc.] would become a subsidiary of the nucleoelectric generating company or else incorporated in it as a sector for co-ordinating engineering. The same thing could happen to NUCON [Nuclebras Nuclear Plant Construction, Inc], which, incidentally, is already in a process of liquidation.

The main disadvantage of this model is that of continuing to burden the finances of the electrical sector with the costs of facilities for nuclear generation.

Implementation of these ideas requires a policy decision, which so far has been made only implicitly through cutting Nuclebras funding.

Whenever speaking of revising the nuclear program and the nuclear agreement with the FRG, our government leaders always make ambiguous statements, such as those of President Tancredo Neves: "In regard to the commercial agreements resulting from the nuclear agreement, they will have to be examined and made compatible with the nation's economic capability." The Sarney government has in fact adapted the nuclear program to our economic circumstances, restricting it to construction of Angra II, but without reviewing the commercial agreements.

Tancredo Neves said further: "In reference to the specific agreement with the FRG, I think the most rational solution would be to retain it, making those revisions that our scientific and technical community is recommending to the government."

These recommendations are very clear and were summarized recently in a document published by the Brazilian Society of Physics:

1. Cancellation of the agreements to set up joint ventures between Nuclebras and the German companies headed by KWU.
2. Study the reorientation of the Nuclebras subsidiaries toward other productive activities.
3. Restructuring the sector of technological research and development in the nuclear area, strictly for peaceful purposes, meshing the CNEN [National Nuclear Energy Commission] and the research institutes with the universities, transferring CNEN and its institutes to the Ministry of Science and Technology.
4. Evaluate the nation's long-term nuclear-energy prospects, followed by establishment of a nuclear technology research and development plan, with the participation of various segments of society.

It is up to President Sarney to take a step forward in regard to what SEPLAN [Planning Secretariat] has done, ordering the restructuring of Nuclebras along the lines described above as a French managerial model.

This orientation would force renegotiation with the FRG authorities and the KWU (Siemens) group, inasmuch as the present subsidiaries of Nuclebras would have to be divided between Nuclebras and ELETROBRAS.

Experience shows that there is flexibility on the German side whenever it glimpses the possibility of continued purchases made in Germany and preservation of the diplomatic agreement that gave rise to the commercial agreements.

"The restructuring of technological research and development in the nuclear area, strictly for peaceful purposes" called for by the scientists can be achieved as part of this negotiation.

There would thus be ended 10 years of a bitter debate between government and scientists that was very educational for Brazilian society, because it prevented the errors that were committed in the nuclear area from being made in other important areas, such as informatics, computers, the aeronautical industry and others.

Collapse of the Nuclear Program from this point of view should be seen as a victory for the nation--and not just for its scientists.

8834
CSO: 5100/2154

BRAZIL

NUCLEBRAS HEAD SAYS PROGRAM'S FAILURE DUE TO LACK OF FUNDS

Uncertainty Marks Nuclear Program

Rio de Janeiro O GLOBO in Portuguese 27 Jun 85 p 23

[Text] "The world of fantasy has ended." That was the comment of the president of the Brazilian Nuclear Corporation (NUCLEBRAS), Licinio Seabra, on the Brazilian nuclear program, which is 10 years old today. In 1975, the Brazil-German program provided for the construction of eight atomic plants by 1990 to generate electric energy in the Southeastern Region. The then president of NUCLEBRAS, Ambassador Paulo Nogueira Batista supported the construction of 40 plants by the end of the century.

In these 10 years, Brazil spent \$4 billion on the program and has a foreign debt of \$2 billion. The first plant, Angra-II, has not yet been completed and Angra-III is on its foundations, \$2 billion more being needed to complete it. On the date of its anniversary, the Brazilian nuclear program is uncertain. The government of the New Republic wants a plan for the turn of the century and is seeking to reconcile the shortage of funds with a pace of work that will make it possible to absorb the technology. The minister of mines and energy, Aureliano Chaves, admits that it will be necessary to renegotiate the agreement with the Germans.

The failure of the program is attributed by the president of NUCLEBRAS to the lack of definite financial support. Licinio Seabra believes that to carry forward the minimum program a sure source of funds that does not depend so much on German marks is essential.

"As it is, it is not viable, not realistic," he said.

Despite saying that it will be up to the Ministry of Mines and Energy and the Brazilian Electric Power Stations Corporation (ELETROBRAS) to decide the number of nuclear power stations to be built in the country, Licinio Seabra supports the construction of another plant to go into operation 2 years after the completion of Angra-II and III scheduled for 1991 and 1993. According to him, the plant, which should be begun next year at a still undetermined site, is necessary to preserve the engineering team and guarantee the process of absorption of technology.

Of the \$4 billion already spent, \$2.8 billion was invested in the first two plants and in the fuel cycle project. The remaining \$1.2 billion pertain to the financial charges (interest and amortization.)

Licinio considers that in the past 10 years technology was absorbed in various phases of the cycle, as in the conversion of uranium concentrate, enrichment, reprocessing, mining, construction of heavy components and power plant engineering.

The fuel cycle projects already completed are the heavy components factory, NUCLEP, which costs \$350 million; the plant for the production of uranium concentrate (yellow cake) in association with the French Pechiney Company; and the assembly part of the fuel elements factory. The demonstration plant of uranium enrichment by the jet-nozzle process developed jointly with Germany will be completed by the end of next year (it costs \$300 million.) The construction of the industrial unit with a capacity to enrich uranium for three nuclear plants will cost \$1 billion.

Seabra admitted that the creation of an ELETROBRAS subsidiary to build nuclear power plants and the privatization of NUCLEP are being studied. NUCLEBRAS would remain in charge of only the fuel cycle.

NUCLEBRAS Could Be Closed

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 28 Jun 85 p 3

[Editorial article: "In the World of Fantasy"]

[Text] NUCLEBRAS, which lived 10 years in the "world of fantasy", could be closed, its plant construction functions being transferred to ELETROBRAS while another small company would be in charge of the work connected with the enrichment of uranium. It would thus be possible to achieve considerable savings in a company that today has six subsidiaries, employs 5,200 persons with a payroll of \$3.5 million a month and owes so much that it can only buy material, even the most simple material for daily use, by paying cash.

That is the picture of NUCLEBRAS drawn by its president, Engineer Licinio Seabra, who proposes its deactivation after 10 years' existence of the nuclear agreement signed with Germany, a period in which it lived in a "veritable fantasy world." NUCLEBRAS has already invested \$2.8 billion but has a service of about \$1.2 billion on the debt contracted in that country. NUCLEP's (one of its subsidiaries) equipment factory alone--imported to build nuclear reactors in Brazil when they were being deactivated throughout the world (including this one that was transferred here...)--cost \$300 million and is practically at a standstill. Inside it, NUCLEBRAS stocks electronic equipment shipped by Germany for nuclear plants II and III valued at \$3 billion, which Brazil received unwillingly because there is no prospect that it will be utilized.

A reading of Licinio Seabra's interview is cause for amazement and alarm. An important aspect of the disastrous results of the closed decisions by the military techno-bureaucracy, dominant in the last 21 years. First, the boldness with which public funds were committed, which, if the plan had gone ahead would have reached about \$40 billion to generate unnecessary energy. Alongside that, one notes clearly in this case how the state machinery operates. Once the agreement with West Germany was signed, providing for the installation of eight plants, companies began to be created one after another--today six in number--with very expensive structures. Thus, 5,200 persons were employed the only production of which was bureaucracy, as our report from Rio said yesterday. Only the economic crisis through which the country passed--already perfectly foreseen in 1975 when the nuclear agreement was signed inasmuch as we were aware of the situation of the oil price explosion--prevented another similar series of companies from emerging and other thousands of employees from being contracted.

That is the way the state machine works in its zeal to generate unnecessary to sustain itself.

After 10 years, the fantasy has ended. Fortunately, a single voice remains in this New Republic, that of Licinio Seabra, preaching a belated conservation, which must begin with the closure of the company. This would mean the transfer of its functions to ELETROBRAS, of which it would become a department, should imply the draining of its staffs and expenses. There would be little point in merely swelling the electric energy billings even further; it is already facing financial difficulties to carry out the minimum projects necessary for the domestic supply. Implicit in the proposal of the president of NUCLEBHAS is that it is not viable--like the nuclear program originally approved by General Geisel--and no longer has any reason to exist, just as the nuclear plants were not justified.

When we read that interview, we could not fail to ask if that is not the situation of a large number of the 422 state companies registered by the Special Secretariat of State Enterprises (SEST); actually, there are more than 500 in the federal area alone. How much could be saved by simply privatizing them or abolishing them, as Licinio Seabra proposes for the NUCLEP equipment factory, which competes with private industry? How many more, today a burden to the state, could be transferred to private hands?

In this order of reasoning, there is the satisfaction to see finally someone who belongs to the government staffs have the courage to make these exposures.

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BRAZIL

NUCLEBRAS TECHNICIANS DOUBT ANGRA III WILL BE HALTED

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 18 Jun 85 p 26

[Text] Brazilian Nuclear Corporation (NUCLEBRAS) experts declared in Rio yesterday that the complete suspension of the Angra-III nuclear plant project could represent losses to the country of approximately \$1 billion already invested in works and equipment and another \$900 million committed to commercial contracts with KWU. They do not believe that measure will be taken by the government and argue that there are other projects to be cut in the company's timetable.

The Angra-III project is still in the beginning stage; thus far, only the ground-leveling work and preparation of the project bed have been completed. Since the civil works have not yet begun, it may appear that it is easy to deactivate the project but, the experts ask: "What to do with the equipment stored in Itaguaí, formerly stored in the port of Hamburg, Germany, and which cannot remain very long subject to the action of rust and sea air?"

The NUCLEBRAS experts warn that the manufacturer's guarantee period is 5 years and 70 percent of the Angra-III equipment is already stored in the Nuclebras Heavy Equipment Corporation (NUCLEP) in Itaguaí awaiting assembly. The Brazilian Government must decide either to continue the civil works and make up the delay to put that plant into operation by the year 1992 or renegotiate with KWU to see if it will accept that equipment back.

In the opinion of the experts, what would be absurd would be to stop construction of Angra-III and let the equipment deteriorate through the action of time. There is very sophisticated electronic equipment, many turbines with very heavy shafts that can warp by being subjected for a long time to the force of inertia and must be submitted to periodic tests in maintenance plants. Because of a lack of funds, none of this is being done and the two plants, Angra-II and Angra-III, run the risk of giving as much trouble as is presently occurring with the Angra-I plant, if they go into operation.

Obviously, say the experts, it is not in the interest of KWU to expose itself to such safety and reliability risks because it has a market and a reputation to protect and it is already looking with misgivings at the headaches that the U.S. Westinghouse Company has been having with Angra-I.

Manifesto

In commemoration of the 10th anniversary of the Brazil-Germany nuclear agreement, the union of engineers of the state of São Paulo, of Rio Grande do Sul, the Regional Economic Council of Rio de Janeiro and the Association of Peace Studies yesterday released a manifesto that, in addition to condemning the errors committed calls for a reevaluation of the country's energy policy, asking also that the authorities of the New Republic fulfill the commitments assumed to adapt the nuclear agreement to the real needs of the country in terms of energy and technology without taking into consideration nepotism and other lesser interests.

In the opinion of the former director of the Nuclebras Engineering Corporation (NUCLEN), Joaquim de Carvalho, Brazil will not need nuclear energy until the first decade of the next century.

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BRAZIL

CHAVES DEFENDS ANGRA III CONSTRUCTION; EDITORIAL COMMENT

Ministry Cites Infrastructure

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 21 Jul 85 p 38

[Text] Brasilia--The Mines and Energy Ministry wants to retain--even if at a slower pace--the plan for constructing the Angra III nuclear power plant, which is included on the blacklist of government cuts. Mines and Energy Minister Aureliano Chaves has taken a position in support of Angra III with the argument that the plant is needed to keep the nation's infrastructure functioning until the years after 1990, when nuclear energy will become a necessity.

Forty percent of the equipment for Angra III, the second power plant of the Brazil-West Germany agreement, is either ready or on order and its foundations are finished. Investments of 46.8 billion cruzeiros are planned for this year, to build the construction shops and offices. If the project is interrupted, 40 billion cruzeiros must be spent for penalties and other personnel costs in deactivating the job.

It was 10 years ago, on 27 June 1975, that Brazil signed the treaty with West Germany. The intention was to construct eight nuclear power plants by 1990, with investments of \$18 billion, including \$13.8 billion for the power plants, \$3.7 billion for the fuel-cycle units and \$900 million for investment in technology. The first plant under this agreement, Angra II, is not likely to begin operation until 1991.

What actually happened was a complete revision of the initial grandiose plans, which further called for building 35 more nuclear plants by the year 2000 and the transformation of Brazil into a Third-World nuclear power, an exporter of power plants and enriched uranium.

So far, Brazil's nuclear program--which began in 1971 when the U.S. firm of Westinghouse was hired to build the first plant, Angra I--has consumed \$5.8 billion, including \$1.8 billion for Angra I, which is among the plants generating the world's most expensive energy--\$2,875 per kilowatt--and the remaining \$4 billion for the FRG program. Angra I did not enter operation until 14 years after it was begun, and even so it still depends upon investments of \$300 million to operate with the necessary reliability.

Revision

The mines and energy minister intends to make a complete reevaluation, with the Germans, of the nation's nuclear-energy program, renegotiating its clauses that are now entirely obsolete in regard to power-plant construction and cutting corners in the technological area.

The greatest progress so far has been in this latter area: Brazil now produces uranium concentrate (yellow cake) and uranium hexafluoride (gas); it is beginning to test the "jet-nozzle" enrichment process this year; it produces fuel elements, 80 percent of engineering services and almost 100 percent of all heavy equipment for a nuclear power plant.

In this renegotiation, the minister is likely to propose cancellation of the two nuclear plants, Iguape I and II, that were contemplated to follow. The decision to build these plants will be made by President Sarney's successor, depending upon market conditions for electrical energy.

Aureliano also intends to completely revise the structure of Nuclebras, which will lose its Brazilian subsidiaries and become a department of ELETROBRAS [Brazilian Electric Power Companies, Inc], responsible for building nuclear plants. The only thing kept will be a nuclear technology enterprise in charge of developing the fuel cycle and specific process engineering.

With this liquidation, the government will take over the charges on a \$2 billion debt and a domestic debt to banks and suppliers of about 400 billion cruzeiros. ELETROBRAS would become responsible for building Agra II by 1991 and Agra III, which according to what has been arranged, may be delayed by as much as 3 years, until 1994. To conclude both plants, another \$1.9 billion will be needed, including \$900 million for Angra II and \$1 billion for Angra III. So far, \$900 million has been spent on the first and \$300 million on the second plant.

Doubts Expressed About Program

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 21 Jul 85 p 3

[Editorial: "Defending the Indefensible"]

[Text] There is a resurgence of an old idea for justifying unjustifiable projects: it is better to complete them, because to halt them at the current stage would be more expensive. This was used by the technocrats to go ahead with building USIMINAS [Minas Gerais Iron and Steel Mills, Inc.] and the Steel Railway and now, albeit timidly, is being advanced to force construction of the Angra III nuclear power plant. An argument (false, of course) often used is that a large part of the equipment for this plant has already been bought and is being stored in NUCLEP [Nuclebras Heavy Equipment, Inc], in Rio de Janeiro; the respective computer is already on its way to Brazil, unless we want to suspend the shipment and pay for storing it in Germany. To stop now would cause greater damage than to continue...

Now, we all know that this is not the truth. Brazil bought 40 percent of the equipment earmarked for Angra III, which was delivered immediately by the German

suppliers simply because it was already practically ready, standing idle due to cancellation of nuclear power plants planned for that country. But this, after all, does not mean so much if we recall that to build this additional plant we will spend at least \$3 billion--an optimistic estimate. It is argued that conclusion of the work that has begun would cost the country no more than \$1 billion, which is not true, if only because financing costs must be added.

Moreover, Nuclebras has not yet signed a contract for constructing Angra III. It has committed itself with the contracting firm--very interested in defending the idea that it is cheaper to go ahead than to stop----only in regard to land preparation. Only this. There is thus no future penalty for contract violations that could make it more expensive to quit, as occurs in other projects.

Lastly, we insist that it is not true that it would be possible to conclude Angra III with \$1 billion. It would cost at least \$2 billion more than that, if not more! And, as if arguments showing the advisability of postponing it indefinitely were not enough, there is this decisive point: there isn't enough money to carry out ELETROBRAS' most urgent projects, the indispensable minimum to meet growing demand and also to strengthen the transmission and distribution systems. We may even have some difficult times unless there is a perfect and rational application of the already limited funds. How is it possible to begin simultaneously construction of two--note: two, not one!--nuclear power plants whose price represents at least twice that of any hydroelectric plant, and this in a country that still has an immense potential to tap?

Nothing, absolutely nothing--except injured vanity or jeopardized interests--justifies the idea that is now being raised to the effect that it is more economical to build Angra III than to quit. This is the position of contractors and bureaucrats. In fact, it is indeed symptomatic that this idea appeared in the press after Mr Aureliano Chaves visited the construction sites of the nuclear program (including the aberrant NUCLEP, a nearly idle plant for building atomic reactors!) and had conversed with the father of the FIIG agreement, Gen Ernesto Geisel. He left there contradicting what he had said before, especially when he was chairman of the National Energy Commission: after all, Brazil needs nuclear energy! Only he did not say when, at what cost and for what.

The mines and energy minister knows that the president of the republic decided on creation of a high-level commission, with representatives of all sectors, including independent members of the government, to render an opinion about the nuclear program and the agreement with West Germany. He must therefore take steps for this commission to be set up and to be given free access to all documents, many of them still secret. Meanwhile, everything remains as it is--that is, the most that will be done is to finish Angra II. And that is already too much for a country that still has 200 million kilowatts in its rivers waiting to be tapped.

Mr Aureliano Chaves should really be thinking about an arrangement to replace any equipment purchased in Germany with other equipment of greater use at this time. Or else freeze everything, as Brazil cannot spend \$2 billion just to justify unwise purchases in the past.

BRAZIL

AMENDMENT BANNING PRODUCTION OF WEAPONS TO BE PROPOSED

Sao Paulo FOLHA DE SAO PAULO in Portuguese 17 Jun 85 p 4

[Text] Brasilia--Impressed by the support he received for proposed constitutional amendment declaring that Brazil will not build an atomic bomb, Deputy Helio Duque (Brazilian Democratic Movement Party--Parana) announced yesterday that he will be in a position to present the proposal for legislative consideration at the end of next week.

"It is a tribute to the Brazilian Armed Forces," he emphasized, "which have always declared themselves to be peace-loving and supporters of peaceful coexistence with our neighbors as well as a tribute to the Brazilian Government, whose anti-war intentions reflect the sentiment of our people."

The constitutional amendment bill already has more than 200 deputies' signatures, which would be enough to guarantee its consideration, which requires only the support of one-third of the members of the Senate (23 senators.)

Military Reaction

Helio Duque was with President Jose Sarney the day before yesterday and, according to him, before going into his office he was called discreetly by an officer interested in the bill and in exchanging ideas on the subject.

The proposal consists in adding another paragraph to Article 7 of the constitution which presently has a single paragraph stating that Brazil will not engage in a war of conquest. The Parana deputy believes it is a matter of adding that Brazil will not build nuclear devices for military purposes, nor purchase or permit the transit of atomic weapons through its territory.

The deputy points out also that the Brazilian Government is a signatory of the Tlatelolco Agreement on the denuclearization of Latin America, which reflects the measure of its peaceful purposes with regard to the utilization of atomic resources.

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BRIEFS

NUCLEAR AGREEMENT REEXAMINATION--Mines and Energy Minister Aureliano Chaves yesterday announced that the Brazilian nuclear program and the construction of more than five nuclear plants, established in an agreement with the FRG, will be reviewed by a high-level commission made up of representatives of the government and the Brazilian scientific community. After meeting with President Jose Sarney at Planalto Palace, Aureliano Chaves reported that the nuclear program will be reexamined in view of the country's economic situation. The commission, to be established in the next few days, will be coordinated by the Mines and Energy Ministry and will have 120 days to make the study. According to the mines and energy minister, one point has already been decided: The investment in the nuclear program will be reduced but the Angra II and III nuclear plants must be concluded. [Text] [Rio de Janeiro O GLOBO in Portuguese 12 Jul 85 p 17 PY]

NUCLEAR PROGRAM REASSESSMENT--Mines and Energy Minister Aureliano Chaves has proposed to President Sarney that he form a commission to reassess the nuclear program within 120 days. Chaves advocates a slowdown in the work on the projects, while the Secretariat of Planning advocates a total halt. [Excerpt] [Sao Paulo Radio Bandeirantes Network in Portuguese 1000 GMT 24 Jul 85 PY]

JAPANESE-BRAZILIAN AGREEMENT--A scientific and technological cooperation agreement was ratified on 21 June between Brazil and Japan. The agreement entails training in the fields of computer science, microelectronics, nuclear energy, biotechnology in food processing area, health, energy, and technology. [Summary] [Sao Paulo O ESTADO DE SAO PAULO in Portuguese 22 Jun 85 p 13]

NUCLEAP PROGRAM COMMISSION--Mines and Energy Minister Aureliano Chaves would like to institute a high-level commission with the participation of the scientific community, which will propose changes in the nuclear program. [Text] [Sao Paulo Radio Bandeirantes Network in Portuguese 1000 GMT 12 Jul 85]

CSO: 5100/2142

CHILE

BRIEFS

'NO PLANS FOR ATOMIC BOMBS'--Santiago, 17 Jul (AFP)--National Energy Commission President Herman Brady today stated in Santiago that Chile has no plans to build atomic bombs. The country has not even begun research in the military use of nuclear energy, and it does not have any plans to do so in the future, stated Brady, whose post is ministerial level in the government. According to Brady, Chile seriously believes in the Tlatelolco Treaty, which bans the proliferation of nuclear weapons in Latin America. The Chilean support of that treaty is a political decision that will be maintained, Brady added. [Text] [Paris AFP in Spanish 2123 GMT 17 Jul 85 PY]

CSO: S100/2145

EGYPT

BRIEFS

URANIUM, THORIUM IN AL-BUHAYRAH--Cairo, 4 Aug (MENA)--Egyptian experts working at the Nuclear Materials Organization have discovered uranium and thorium at (Abu Fhashyah) village, one of the Markaz Rashid villages in Al-Buhayrah Governorate. The experts emphasize that these two substances exist in large enough quantities to allow economic extraction from black sands that cover a 6 by 2 kilometer area. Dr 'Ali al-Sukkari, chairman of the Soil Chemistry Department of the Nuclear Materials Organization told the Egyptian paper 'AL-MASA' that an Australian company has been entrusted with extracting nuclear matter from the black sand and will begin producing uranium in this region. The first phase of extraction, he said, will cost about 5 million pounds. This will involve building two factories. The first factory is to produce monazite, a substance used to extract uranium. The second is to produce zirconium, from which thorium is extracted. Al-Sukkari added that the organization will continue to explore for these substances in the area extending from west of Alexandria to Rafah in the northern Sinai. [Text] [Cairo MENA in Arabic 1525 GMT 4 Aug 85]

CSO: 5100/4611

INDIA

DECISION ON NONPROLIFERATION PACT EXPLAINED TO IAEA

Bombay THE TIMES OF INDIA in English 14 Jun 85 p 16

[Text]

VIENNA, June 13 (PTI).

INDIA has told the International Atomic Energy Agency (IAEA) that it opted to remain away from the nuclear-non-proliferation treaty when it became clear that the treaty was going to be discriminatory and ineffective.

The background of the decision was given to the agency's board of governors' meeting here by Indian governor on the board, ambassador, Mr. S. K. Singh, in the course of a 30-minute review of the agency's annual report, which summed up India's "overall thinking" on all issues concerning the agency.

Mr. Singh told the board that in recent months India had been subjected to fresh appeals by "some friends" that it should "accede to the non-proliferation treaty."

He said that when the non-proliferation treaty was being negotiated, India had proposed the inclusion into the text of an article providing for complete stoppage, by nuclear weapon states of their production of nuclear weapons and a cut-off in the production of fissionable materials for weapons purposes.

"If only this request of ours had been heeded then international safeguards could perhaps have been extended to all nuclear facilities in nuclear and non-nuclear weapons states", he said.

Mr. Singh further contended that nuclear weapons states were not even prepared to discuss the matter then. It was clear to the rest of the world then that the treaty was going to be both discriminatory and ineffective.

Since then, he added, nuclear arsenals had risen dangerously. Thus if the matter were to be considered today it would be necessary to reduce "their arsenals significantly".

EXCLUDED MATERIAL

Reviewing the ineffectiveness of the treaty, Mr. Singh said that although it claimed a large number of signatories, in practical effect 13 years after the treaty came into force, only 32 per cent of all nuclear power reactors, representing a similar share of nuclear power generating capacity, were covered by the non-proliferation treaty safeguards. This did not include "the vast quantities of nuclear material in facilities dedicated to the production of nuclear weapons in nuclear weapons states", he said.

Turning to IAEA membership, Mr. Singh said 35 out of the total 112 member states could be considered industrially and economically developed. But only 14 of these had significant nuclear activities. And only 10 had shown political will for exempting themselves in significant nuclear work. Eighteen others had desired to pursue the benefits of nuclear science for future generations. Just 12 countries had given high priority for exploiting the potentials of nuclear science and technology.

Mr. Singh said India's attitude to the NPT was based on the country's philosophy to the question of disarmament. It was neither a by-product of any ambition nor a response to any power far away or near to India.

He added these were the reasons why India did not agree to participate in the review of the treaty, which it chose to keep away from.

CSO: S150/0036

INDIA

COMMENTARY VIEWS PAKISTAN'S NUCLEAR PROGRAM, INTENTIONS

BK191359 Delhi THE HINDUSTAN TIMES in English 15 Jul 85 p 8

[Editorial: "The Pa': Bomb"]

[Text] The report by an American television correspondent that Pakistan has successfully tested in non-nuclear explosions U.S.-made Krypton electronic triggers used to set off nuclear bombs need not provoke a panicky Indian reaction since Prime Minister Rajiv Gandhi has stated on more than one occasion that New Delhi is fully alive to Islamabad's nuclear developments as also its dubious intentions. Nevertheless, the report attributed to U.S. intelligence sources, but neither confirmed nor denied by the U.S. Government, is of a piece with the formidable weight of the evidence earlier adduced by such informed persons as U.S. Senator Cranston and the U.S. Nuclear Control Institute that "the Pakistanis have been all over using legal and illegal means to get whatever they need to augment their nuclear weapons program."

That Pakistan has been using fair means and foul to smuggle out of the U.S. and other advanced European countries vital electronic components needed to achieve its nuclear ambitions was brought home not long ago when several Pakistanis in private capacity unsuccessfully tried surreptitiously to take out of these countries sophisticated devices in bits and pieces that could only be used to trigger an atomic explosion. If Islamabad has indeed succeeded in hoodwinking U.S. security agencies to get what it was desperately looking for, it should be enough to cause alarm in Washington. But considering the manner in which the Reagan Administration has acted in the recent past to pamper the Zia regime, it looks as though nothing short of a full nuclear test by Pakistani scientists will make U.S. policy-makers realise the gravity of the situation. If Washington still doubts Pakistani duplicity in the matter of its nuclear intentions, it must surely be living in a fool's paradise.

The Pakistani 'Islamic' bomb poses a real danger not to the U.S. but to India, and it is our policy makers who should spell out appropriate counter-measures to meet the Pakistani threat. Merely hedging the issue or saying that India will react only after the Pakistani fait accompli has been proved may be too late to counter Zia's blackmail. When an Israeli general, who had earlier headed the Mossad intelligence outfit, was asked by an Indian correspondent some years ago what his country would do in the event of Pakistan acquiring a nuclear bomb and whether it was contemplating any pre-emptive attack on

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Worldwide Report

**NUCLEAR DEVELOPMENT
AND
PROLIFERATION**



FOREIGN BROADCAST INFORMATION SERVICE

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HONG KONG

AGREEMENT TO FINANCE NUCLEAR POWER PLANT SIGNED

Hong Kong HONGKONG STANDARD in English 13 Jun 85 pp 1, 14

[Text]

THE Hongkong Nuclear Investment Company Limited (HKNIC) signed an agreement yesterday for the issue of bills of exchange by tender worth \$500 million.

The money raised under the facility will be used to provide the greater part of HKNIC's equity investment in the joint venture company for building the Daya Bay nuclear power plant.

The issue is guaranteed by the Hongkong government, arranged by Schroders Asia Ltd and fully underwritten by the Hongkong and Shanghai Banking Corporation, Standard Chartered Bank and Schroders Asia Limited.

The remaining \$300 million, which makes the total equity of \$800 million (US\$100 million), will be provided by China Light and Power Company as the holding company.

Following the signing ceremony the chairman of the HKNIC, Mr William Stones, said: "With the government's guarantee and the granting by the Financial Secretary of Specified Liquid Asset status, the bills drawn under the facility will be unique in Hongkong."

The commercial loans will mature in 1991 and there is no pre-set interest rate.

However, there will be a maximum margin over the Hongkong inter-bank rate, but the actual rate will be subject to the tenders, Mr Stones said.

The tender panel comprises BA Asia Ltd, BT Asia Ltd, Banque Indosuez, Barclays Bank PLC, Chase Manhattan Asia Ltd, Citicorp International Ltd, Jardine Fleming and Co Ltd, Grindlays Asia Ltd, Lloyds Bank International Ltd, Manufacturers Hanover Asia Ltd, Paribas Asia Ltd, Sanwa International Finance Ltd, Schroders Asia Ltd, Standard Chartered Asia Ltd and Wardley Ltd.

Meanwhile, Mr Stones said negotiations on the contract with the French nuclear manufacturer, Framatome, and Britain's General Electric Company to construct a 1,000 megawatt nuclear plant will start between June 20 and 25.

Negotiations will also take place at that time with another party, Electricite de France, which will be responsible for the civil project services.

Mr Stones said a lot of work had been done on studying the technical aspects and the forthcoming negotiations will centre on commercial matters.

Mr Stones said he hoped to sign a letter of intent, at the right price, with these companies by the end of August. It will then go to the board for authorisation so that work can proceed before the end of this year.

This schedule aims to have the first 900-megawatt reactor turbine running by the end of 1991.

Asked what would happen if a fair price cannot be negotiated with these companies, Mr Stones said: "Supposing in the end we really find ourselves in a situation where we could not negotiate a price which we want, which we believe to be a fair price not just from our point of view but also from theirs, there's no point getting a price that is unfair to them or, in fact, to us."

But Mr Stones stressed that the time schedule and time element were important factors in this kind of massive project.

He added that expertise would be given by a consulting firm — Electricite de France — a utility company in France which has already got about 39 nuclear reactors in service with another 15 to 20 under construction.

Mr Stones said the regulatory system set up in China was similar to that in France.

CSO: 5150/0035

JAPAN

AGREEMENT REACHED WITH PRC ON NUCLEAR POWER COOPERATION

OW050955 Tokyo KYODO in English 0945 GMT 5 Jul 85

[Text] Beijing, July 5 KYODO -- Japan and China reached a provisional agreement here Friday on nuclear power cooperation, opening the way for Japan's export of atomic power plant equipment to its communist neighbor.

Details of the agreement, a product of bilateral negotiations opened in October 1983, were not released pending official signing of the accord, probably at a bilateral ministerial meeting set for Tokyo later this month. But chief Japanese negotiator Yoshifumi Matsuda, director general of the Foreign Ministry's Office of Science and Technology Affairs, said the agreement includes provisions ensuring peaceful use of nuclear power and the related technology to be exported from Japan.

China had objected to a proposed provision allowing Japan to call for the return of equipment and radioactive materials in the event of a serious violation of the agreement on the Chinese side.

Speaking to reporters, Matsuda said both Japan and China had made concessions to reach agreement on the content of the provision. He did not elaborate. He said China has so far concluded similar agreements with Italy, France, West Germany, Brazil, Argentina, Belgium and Britain. But only the agreements with Brazil and Argentina contain provisions concerning peaceful use of nuclear power and radioactive materials, Matsuda added. He said Japanese negotiators won Chinese agreement on the provision after telling the Chinese officials that Japanese people are very sensitive about the issue because of the 1945 atom bomb holocaust in Hiroshima and Nagasaki.

China was represented in the five-day negotiations by Jia Weiwen, a member of the State Scientific and Technological Commission. China plans to build about 20 nuclear power plants with combined output of 10 million kilowatts through the year 2000, starting with one at Qinshan, central China.

CSO: 5160/4

JAPAN

RESEARCH COMMENCES ON HIGH-CONVERSION NUCLEAR REACTOR

OW171317 Tokyo KYODO in English 1149 GMT 17 Jul 85

[Text] Tokyo, July 17 KYODO -- Japan has started research on a light water reactor that will be able to produce about the same amount of nuclear fuel as it has used, it was revealed Wednesday. The governmental Japan Atomic Energy Research Institute said it hopes to complete research and development on the reactor by about 1995 so that it can be put to practical use by about 2000. The new reactor is called a high-conversion light water reactor (HCLWR).

According to the institute, there has been such a great delay in the development of a fast breeder reactor that the chances of it being put to use in the near future are slim. Kansai Electric Power Co., which is Japan's main user of the pressurized water reactor (PWR), on which research is being based, and Mitsubishi Heavy Industries Ltd., builder of the PWR, are showing strong interest in the HCLWR research. The two companies also intend to work to develop their own new reactor -- a high-conversion PWR -- while seeking the cooperation of the institute.

The Science and Technology Agency, recognizing importance of the HCLWR, secured a 40 million yen budget for the project for fiscal 1985 and intends to seek a 370 million appropriation for fiscal 1986. The institute said that the HCLWR increases the density of fuel-rod placement in light water reactors, now in wide use in Japan, in order to reduce the amount of water running between fuel rods, and cuts the ratio of neutrons -- jumping out in nuclear fission -- absorbed by water so that uranium 238, which is nonfissionable, will absorb much more neutrons and thus be converted into plutonium 239, which is quite fissile. The speed of neutrons in the projected reactor will be much greater than that of a common light water reactor, researchers said.

CSO: 5160/9

JAPAN

BRIEFS

NUCLEAR FUSION DATA LINK WITH U.S.—Tokyo, June 5 KYODO—Leading nuclear fusion research organizations from Japan and the U.S. plan to develop a package of codes capable of analyzing and evaluating each other's data using their own supercomputers. The plan, aimed at promoting bilateral cooperation in the scientific field, is planned for completion within a year. The Plasma Institute at Nagoya University, central Japan, will launch a test of software for file transfers from July 1 following over five years of tests on programming instructions, Hideo Ikegami, a professor at the institute said Wednesday. The institute's partner in the project is the Lawrence Livermore National Laboratory in California, which provides a nationwide data exchange network, called the Magnetic Fusion Energy Network (MFENET), connecting five major U.S. governmental institutes via a Cray-1 supercomputer, Ikegami said. Meanwhile, the Japanese institute has installed Fujitsu Ltd's VP-100 supercomputer, which connects terminals at the country's nuclear energy research centers, he said. "The computer codes to be developed, will enable U.S. and Japanese researchers to check each other's study results faster," the professor said. [Text] [Tokyo KYODO in English 0338 GMT 5 Jun 85]

PRC NUCLEAR PROJECT BIDS—Hong Kong, 21 Jun (KYODO)—Three Japanese construction companies—Taisei Corp., Maeda Construction Co. and Shimizu Construction Co.—have been made specified tenderers for a nuclear power plant project in the Shenzhen Special Zone, Guangdong Province, China, reliable informed sources here disclosed Friday. The Japanese construction companies, which are members of consortium with French and Chinese firms, are on a list of six consortiums invited to bid for the project, worth about 30 billion Hong Kong dollars, the sources said. The nuclear power plant will have two reactors with a total capacity of 1.8 million kilowatts located along Dayan Wan, Shenzhen City. Tenders will be submitted on 30 August, they said. [Text] [Tokyo KYODO in English 0304 GMT 21 Jun 85 OW]

CSO: 5160/6

PEOPLE'S REPUBLIC OF CHINA

WEN WEI PO URGES SINO-U.S. NUCLEAR COOPERATION

HK300544 Hong Kong WEN WEI PO in Chinese 30 Jun 85 p 2

[Editorial: "Eliminate the Obstacles to Sino-U.S. Nuclear Energy Cooperation"]

[Text] On the eve of President Li Xiannian's visit to the United States, the United States sent a 6-person delegation headed by Richard Kennedy, ambassador-at-large, to Beijing to discuss the issue of nuclear energy cooperation. According to U.S. officials, great progress was made in the talks. However, China's XINHUA NEWS AGENCY merely said that they held "profitable talks."

News from Washington says: The United States and China may formally sign an agreement on nuclear energy cooperation when Li Xiannian visits the United States in July.

It is known to all that the United States is the one to be blamed for the delay in the formal signing of the nuclear energy cooperation agreement. In late April, 1984, when President Reagan visited China, he initiated the agreement on nuclear energy cooperation. However, the United States kept procrastinating on the presentation of the agreement to Congress for examination and approval. On 16 April this year, that means 14 months after Reagan's visit, the U.S. House of Representatives approved the amendment to the "export control regulations," thus making the examination and approval of the agreement on nuclear energy cooperation even more complicated and harsh. The new amendment empowers Congress to veto nuclear energy cooperation. In addition, it prolongs the examination time from 60 days to 90 days and makes hearings a must. According to the old regulations, Congress would have almost no other alternative but to approve the Sino-U.S. nuclear energy cooperation agreement which was presented to Congress for approval by the White House.

On the issue of transfer of advanced technology to China, because of the pressure put on the Coordinating Committee for Export Control by the United States, the latter has lifted its restrictions on the export of microcomputers to China. However, it has extended the embargo to the export of superconducting materials, robots, gas turbine technology, and computer software. This policy is in fact protectionism in the area of technology transfer.

This policy is not in the interest of U.S. development of its foreign trade. U.S. financial groups react to this differently. U.S. nuclear industry is experiencing a crisis of a rapidly shrinking market. In the next 10 years, if the United States can expand its nuclear energy market in China, its nuclear energy industry will be able to receive orders valued at about \$10 billion and to increase the number of its employees

by 20,000 to 50,000. Thus, the industry hopes the White House will sign the Sino-U.S. agreement on nuclear energy cooperation as soon as possible. Ambassador Kennedy's visit to China indicates that in the United States, people are increasingly urging the signing of the agreement on nuclear energy cooperation.

Some congressmen are of the opinion that it is necessary to ask China to provide a written guarantee for U.S. supervision and control in order to prevent the transfer of nuclear technology to other countries. China is a member of IAEA and has consented to supervision. On many occasions, various Chinese leaders have openly announced that "China does not favor nuclear proliferation; it does not, and will not, help any non-nuclear country develop nuclear weapons."

Without the help of foreign nuclear technologies, China produced A-bombs long ago. China could have proliferated military nuclear technology long ago. However, so far China has not transferred its nuclear weapons or technology to other countries. China advocates world peace and nuclear disarmament. That is its firm principle. If one has doubts as to whether or not China will proliferate nuclear technology, one is blind to the fact. In the United States, there are many far-sighted people.

They can, by staying away from protectionism, facilitate the development of Sino-U.S. relations. The United States should discard some outmoded political prejudices and eliminate obstacles to the transfer of technology. China and the United States are at different stages of technological and industrial development. Cooperation can only benefit the U.S. economy and world peace.

CSO: 5100/4134

PEOPLE'S REPUBLIC OF CHINA

CONTRACT READIED TO MONITOR DAYA BAY PROJECT

HK240419 Hong Kong SOUTH CHINA MORNING POST in English 24 Jun 85 p 19

[Text] A \$2 million contract to monitor the Daya Bay nuclear power plant is expected to be signed with a British consultancy early next month.

It is understood the Economic Service Branch is drafting an agreement which will be completed within the next week or so, and which will then be forwarded to the United Kingdom Atomic Energy Authority for comments before the signing.

The contract, which includes five elements, will be completed by July 1987 and will involve periodic reports.

These will include advice on the plant's radioactive monitoring programme, accident assessment, contingency plans and publicity matter.

In addition, about five officials from the Royal Observatory and the Medical and Health Department will be trained in the UK in such matters as radioactivity protection and practical laboratory experience.

CSO: 5100/4134

PEOPLE'S REPUBLIC OF CHINA

BRIEFS

PRC-JAPAN NUCLEAR ENERGY ACCORD--Beijing, 5 Jul (XINHUA)--China and Japan initialled an agreement on cooperation in peaceful use of nuclear energy here today. The signatories to the document were Jia Weiwen, leader of the Chinese delegation to the talks on the agreement, and Hiroyuki Mazuda, leader of the Japanese delegation. The fifth round of talks on the agreement began July 1 here and proceeded in a friendly atmosphere. [Text] [Beijing XINHUA in English 1622 GMT 5 Jul 85]

CSO: 5100/4134

CANADA

RESTRICTIONS ON SALE OF TRITIUM TO U.S. STUDIED

Toronto THE TORONTO STAR in English 13 Jun 85 p A13

[Article by Bill Walker]

[Text] The external affairs department has launched a study to see what restrictions should be imposed on Ontario Hydro's future sales of radioactive tritium — which can be used to produce nuclear warheads — to the United States.

There is great concern about how the U.S. government may use tritium purchased from Hydro, external affairs spokesman Rejane Dodd said from Ottawa yesterday.

And the Atomic Energy Control Board, the federal watchdog agency for nuclear energy, is worried about how the Americans will guarantee that the tritium will be used for peaceful purposes, board spokesman Hugh Spence told The Star.

The board "is not certain what specifics will be required to be written in a agreement" to sell tritium to the U.S., Spence said.

External affairs and the board must approve jointly any sales to the U.S. by Hydro.

Tritium — a byproduct of nuclear reactors — is a radioactive isotope of hydrogen that sells for up to \$16 million a kilogram. It can be used for peaceful purposes, such as in medical research or in glowing airline signal lights, or it can become a key ingredient in nuclear warheads.

No tritium has yet been sold by Hydro, but a \$100 million tritium recovery plant is to be completed at Hydro's Darlington nuclear station by 1987.

Canada and the U.S. have a longstanding nuclear co-operation agreement. It says materials sold by Canada will not be used for nuclear devices, for research into those devices, or for any military purposes, Spence said.

But while the agreement covers current sales of substances such as uranium, tritium is not mentioned because there have been no sales to date.

One fear, expressed by New Democrat MPP Bud Wildman (Algoma) in the Legislature this week, is that sales of tritium from Ontario to the U.S. will free up American sources of the substance for use in nuclear weapons.

Liberal Eddie Sargent (Grey-Bruce) raised the issue in the Legislature this week when he asked the Progressive Conservative government whether Hydro tritium would be used in some role in the U.S. Star Wars anti-ballistic missile defence system.

"Tritium boosts the yield of an atom bomb about 1,000 times and is essential to the manufacture of the powerful warheads," Sargent said.

CSO: 5120/20

CANADA

GROUPS PROTEST NUCLEAR TESTING, WARSHIPS

Halifax Women's Peace Conference

Toronto THE TORONTO STAR in English 10 Jun 85 pp A1, A16

[Article by Sarah Jane Growe]

[Text] HALIFAX — Women at an international peace conference have demanded that Canada and the United Nations press for a worldwide ban on nuclear tests.

The 350 delegates wrapped up the five-day conference yesterday by sending the demand for a treaty banning such tests to the Canadian government and the U.N.

The conference also produced recommendations opposing military activity in space and weapons of mass destruction, and supporting Nicaragua.

A report from the meeting was given to Quebec Progressive Conservative MP Monique Landry, representing the federal secretary of state's department. She is to take the recommendations to the federal government and to a special U.N. session in Kenya next month.

Avoid controversy.

"Militarism is an addiction that distorts human development, causing worldwide poverty, starvation, pollution, repression, torture and death," the conference document says.

The delegates — from 33 countries, although more than 200 were from Canada — also cited Nicaragua as "the model of a new kind of society" and "a symbol of hope which must be allowed to live."

But the women, who met at

Mount St. Vincent University, did not include a number of more controversial resolutions, despite pleas from Third World participants.

Instead, those recommendations were relegated to a list of about 50 "statements of affirmation," including:

- The release of political prisoners in the Philippines, South Africa and the United Kingdom;
- An end to American aid to El Salvador;
- An end to the U.S. economic blockade of Nicaragua;
- Laws to end Canadian investment in South Africa;
- Cancellation of Canada's cruise missile testing agreement with the U.S.

The "statements of affirmation" were not given formally to Landry. But delegates from the women's conference also are going to the U.N. meeting in Kenya, and they will be free to raise the "statements" there.

"I have had experience in these things," said Joanna Miller, a member of a committee advising Canada's delegation to the U.N. General Assembly. "We cannot submit a grab-bag of ill-conceived proposals."

"The people of the Third World have paid the price with their lives for these proposals," said Cana-

21 August 1985

dian delegate Nonny McLaughlin from Quebec. "If we don't support them, we should not have invited them."

In addition, ideas concerning the Middle East were considered so controversial that they were set aside for discussion at a second international women's peace conference that was proposed for Mideast issues only.

Those ideas included support for an independent Palestinian state, return to Israel's pre-1967 boundaries, condemnation of West Bank settlements, and a Geneva conference on the Mideast that would include the Palestine Liberation Organization.

Esquimalt Base Picketing

Vancouver THE SUN in English 17 Jun 85 p A8

[Text]

Special to The Sun
ESQUIMALT — Military police kept watch Sunday on a small group of protesters demonstrating against visits here by U.S. warships carrying nuclear weapons.

Protest spokesman Phil Esmonde said most Canadians don't know nuclear-armed warships routinely visit bases in Canada and their silence is taken to mean "public complicity with the arms buildup — especially the deployment of sea-launched cruise missiles.

"But we don't think that's the case," Esmonde said in an interview during a 1½-hour protest by about 50 placard-carrying protesters in front of the gates of Canadian Forces Base Esquimalt.

Base information officer Maj. Norbert Cyr refused comment on the protest and on the issue of nuclear-armed U.S. warships visiting the base.

But he said it is national defence policy to "neither confirm nor deny" the existence of nuclear weapons aboard visiting American warships.

Esmonde said that is tantamount to an admission that the government is aware nuclear-armed warships visit Canada regularly.

He said there are U.S. warships at the base about 25 per cent of the time.

A protective ring of connected buoys prevented a small peace flotilla of powered sailboats from moving too close to Canadian warships and a U.S. submarine moored in the harbor.

The demonstration, staged by the Victoria Disarmament Group, was part of an international weekend of protest against deployment of sea-launched cruise missiles by the U.S. and the Soviet Union, Esmonde said.

Cruise missiles pose a particular problem to disarmament talks because they can be armed with either conventional or nuclear warheads, Esmonde said.

Nuclear verification is "virtually impossible under those conditions" and leads to increased mistrust about the number of nuclear weapons each side has, he said.

CSO: 5120/20

CANADA

NUCLEAR COOPERATION AGREEMENT SIGNED WITH TURKEY

Ottawa THE CITIZEN in English 19 Jun 85 p D7

[Text]

The Canadian Press

Canada signed a nuclear co-operation agreement Tuesday with Turkey, taking a halting step toward this country's first foreign reactor sale in five years.

The agreement, which lays the groundwork for future deals in such areas as reactor construction, uranium supply, use of nuclear technology in health, farming and industry, and exchange of experts and technical training, was signed in Ankara by Canadian Ambassador Gilles Mathieu and Turkish Foreign Minister Yashit Halefoglu.

The foundation of the 15-year accord is a Turkish agreement that nuclear supplies and facilities will not be used to make weapons and that it will abide by the Nuclear Non-Proliferation Treaty and open its installations to inspectors from the International Atomic Energy Agency.

While the agreement "envisages co-operation in such areas as the provision of Candu reactors," still to come is the most important decision — whether the Canadian government will give its financial backing to a reactor deal given the unusual terms the Turkish government has proposed.

Atomic Energy of Canada Ltd., the Crown corporation that de-

signs and sells the Candu power reactor, has basically won the bidding for a \$1-billion, 600-megawatt station on Turkey's Mediterranean coast.

But the Turkish government wants AECL to own and operate the reactor for 15 years, recovering the costs of constructing the power station from electricity sales.

AECL has set up a consortium with British and Turkish partners to run the plant at Akkuyu. AECL would hold a controlling 60-percent interest in the consortium.

The government will be asked to provide either export financing through the Export Development Corp. or insure the consortium against any risks inherent in owning a nuclear power plant in a foreign country.

Steve Probyn, Energy Minister Pat Carney's policy adviser for nuclear issues, recently travelled to Turkey to discuss the deal.

Selling a Candu to Turkey would create about 43,000 person-years of employment in the hard-pressed Canadian nuclear industry. (A person-year is government jargon for the equivalent of a full-time job for one person for a year — or, for example, jobs for two people for six months.)

Work is still being done on two power stations sold in 1980 to Ro-

mania and four units being built by Ontario Hydro at Darlington, east of Toronto. But no other work is on the order books.

The government has still not officially seen the financing proposal from AECL, and it is understood that a decision is still some time off. The Turkish deal is the first major decision facing the Conservative government in its policy toward the Canadian nuclear industry.

Don Douglas, general manager of the Organization of Candu Industries, said the industry needs the work that would come from the Turkish deal.

But because of the risks posed by the Turkish proposal, industry spokesmen say that a negative government decision will not necessarily call into question whether the federal government still supports the Candu reactor and the industry that has grown up around it.

"It's really a buyers' market when one can contemplate this kind of thing," Douglas said.

The industry, having won the bid, wants to see the project go ahead "but we're business people too and we realize that the deal has risks," said Hal Dickout, vice-president of power systems for Canadian General Electric in Peterborough.

CSO: 5120/20

CANADA

ONTARIO HYDRO DECLINES DOUGLAS POINT STATION DEAL

Ottawa THE CITIZEN in English 20 Jun 85 p A18

[Text] TORONTO (CP) — An \$81.7-million nuclear power plant opened in 1967 is not worth taking over even if Ontario Hydro did it for a token dollar, says a study by the provincial utility.

Atomic Energy of Canada Ltd., a federal Crown agency, built the 200-megawatt Douglas Point generating station near Kincardine and Ontario Hydro operated it under an agreement designed to reimburse AECL for its power production.

But the plant never produced power cheaply and consistently enough to offset the relatively high capital cost and Atomic Energy decided to cut its losses by closing the station in May last year.

When plans for the closing were announced, Hydro said it would study the possibility of taking over the plant. A preliminary report recommended against such a move at least until more was known about its conditions.

New documents submitted to an Ontario Energy Board rate hearing show the Hydro study team found the station needed "major capital expenditures, comparable to the cost of a new fossil plant," including complete replacement of the reactor's pressure tubes. Estimates for the work ranged from \$120 million to \$230 million in 1984 dollars.

The report said if power demands rise as expected, the plant isn't worth a \$1 takeover in the long run. The long-term cost of adding the plant to Hydro's generating system would range from \$86 million to \$157 million in 1984 dollars depending on whether it was mothballed or immediately overhauled, the report said.

The only circumstance under which the plant would be worth even a nominal \$1 to Hydro would be in a period of unexpectedly high growth in power demands. Then, operation of a rehabilitated Douglas Point station would eventually save the giant utility \$35 million to \$40 million, assuming the plant was back in service "before the mid-1990s," the report said.

"Due to the probable loss under expected or lower load growth, the relatively small potential gains under a higher load growth, and large uncertainties, it is not a reasonable business risk to assume responsibility for the reactor now or to pay AECL to maintain the reactor in a mothballed state to permit future operation," the documents said.

The report included a prediction that it will cost the federal agency between \$60 million and \$125 million to "decommission" the station, a process the utility says will extend over 30 to 35 years.

CSO: 5120/20

CANADA

BRIEFS

ONTARIO HYDRO REPAIR COSTS--Ontario Hydro expects the cost of replacing nearly 800 pressure tubes in two Pickering generating station nuclear reactors to be double an initial \$250-million estimate. In a written submission to the Ontario Energy Board, Hydro said a revised estimate of \$500 million was approved by the utility's board of directors last October. The \$500 million is in addition to about \$450 million in extra coal purchases Hydro expects to make during the three-year retubing period. Hydro said the doubled cost estimate was a result of a lack of time in preparing preliminary estimates. [Text] [Windsor 4E WINDSOR STAR in English 19 Jun 85 p A10]

CSO: 5120/20

INTERNATIONAL AFFAIRS

NUCLEAR ENERGY DEVELOPMENT, CEMA COOPERATION VIEWED

Prague SVET HOSPODARSTVI in Czech Supplement No 62, 1985 pp 1-4

[Unattributed article: Priorities in R&D Cooperation Among CEMA Member Countries: Nuclear Power]

[Text] The executive level economic conference of the CEMA member countries which was held in June last year in Moscow represented an important milestone in the development of the relations among the member countries of the community and further improved socialist economic integration. The conference established long term priorities for cooperation in key national economic sectors and in the area of research and development.

Priorities were also established for the comprehensive R&D program of the CEMA countries through the year 2000. This program is currently in the formulation stages, and all the countries consider it to be primary and definitive. The fields involved are: electronics, comprehensive automation, nuclear power, new materials and technologies, and biotechnology.

In this supplement to SVET HOSPODARSTVI we will gradually focus our attention on each of these priorities. The discussion of each field will characterize world developments and summarize current findings in the given field within the CEMA, as well as future plans.

Nuclear Power

Cooperation Among the CEMA Member Countries in Developing Nuclear Power

The executive agencies of the CEMA included the development of nuclear power among the top 5 long range priorities for R&D cooperation, which is supposed to speed up the application of R&D findings in all participating countries. Cooperation among socialist countries on the peaceful use of nuclear power already has a 30-year tradition. This cooperation has taken place not only in the construction of nuclear power plants but also in non-power applications of nuclear technology in industrial production, agriculture and health care.

Bilateral Cooperative Agreements

The first agreements concerning bilateral cooperation in the peaceful use of nuclear power were signed by the Soviet Union and other socialist countries as early as 1955. The basic purpose of these agreements was for the USSR to provide assistance in the building of a R&D base, the training of scientific personnel, the construction of research-related nuclear reactors, elementary particle accelerators, physical and radiochemistry laboratories in specific socialist countries.

These cooperative efforts bore fruit at the end of the 1950s and in the early 1960s with the startup of national nuclear power research centers in Bulgaria, the CSSR, Hungary, the GDR, Poland, Romania and Yugoslavia. These facilities included 9 functioning research reactors, six accelerators (cyclotrons), and seven radiochemical and physics laboratories. Later Cuba joined in the joint efforts to develop nuclear power. Hence, the USSR assisted in gradually installing physical and radiochemical laboratories, and a research facility in 1969.

Status of Nuclear Research

An important milestone in cooperation among socialist countries in the area of nuclear power was the founding of the Joint Nuclear Research Institute [SUJV] in Dubna near Moscow in 1956. This institute merged two Soviet scientific laboratories for research in high-energy physics. The new institute also received two unique accelerators (synchro-cyclotrons) from the Soviet Government at no charge.

The charter members of the SUJV were Albania, Bulgaria, the PRC, the CSSR, the Korean People's Republic, Hungary, the Mongolian People's Republic, the GDR, Poland, Romania and the USSR. In the 1960s Albania and the PRC recalled their scientists, and North Vietnam and Cuba began to participate in institute activities. All member states have equal rights to the scientific activities of the institute and to its facilities.

At present more than 3000 people work at the SUJV, about 500 of whom are researchers. Scientists from countries outside of the CEMA also work here. Some of the countries represented are Finland, India, Belgium, Austria, and others. The institute also works closely with other centers for nuclear research, such as the European Center for Nuclear Research [CERN] in Geneva, the International Center for Theoretical Physics in Trieste, etc.

The primary mission of the SUJV is joint theoretical and experimental work in physics. These primary activities, however, are closely related to work which can lead to the discovery of still unknown energy resources.

Standing CEMA Commission for Peaceful Use of Nuclear Energy

During the development of nuclear energy R&D problems have continually arisen the solution to which has required complex and costly equipment, considerable sophistication in a number of branches of industry, and the formation of large

scientific and engineering collectives. Given these conditions, which demanded specialization and cooperation in developmental and production work, the Standing Commission for the Peaceful Uses of Nuclear Energy was formed in 1970 by decision of the 13th Session of the CEMA.

The activities of the commission, which coordinates cooperation between member countries in this entire area, are actively participated in by Bulgaria, the CSSR, Cuba, Hungary, the GDR, Poland, Romania, the USSR, Vietnam, and Yugoslavia. The commission has seven coordinating R&D committees.

The basic task of this agency is to facilitate multilateral cooperation among the CEMA member countries in reactor technology, nuclear power and its fuel cycle, as well as in nuclear instruments, radioisotope techniques and apparatus, radiational and shielding techniques, safety practices related to sources of ionizing radiation, and the standardization of products related to nuclear technology. All activities of the commission are thus directed towards the more efficient integration of nuclear technology into the economies of the member countries.

Interatominstrument

The production of instruments and nuclear equipment represents an important component of the cooperation among the CEMA countries in the peaceful use of nuclear technology. An international economic association, Interatominstrument, has been active in this area since 1972, with headquarters in Warsaw. The activities of this association are directed at coordinating work on the design and production of nuclear instruments and on the full satisfaction of the requirements of the member countries in terms of the product mix and quality of this equipment.

Interatominstrument has 51 employees, 29 of whom are specialists and 22 of whom are technical personnel. In addition to the Warsaw headquarters, branches have also been constructed at Zielona Gora in Poland, at Dubna in the USSR, and Plovdiv in Bulgaria.

Radioisotopes and Sources of Ionizing Radiation

An Agreement Concerning Multilateral Specialization and Cooperation in the Production of Radioisotopes was signed in Moscow in 1974. The first years after the agreement was signed saw the establishment of multiple production facilities in various countries for radioisotopes, labelled organic and inorganic compounds, radio-pharmaceutical preparations, sources of ionizing radiation, and a number of stable isotopes. Currently the list of products specialized in by the production facilities participating in this agreement is more than 1,250 items long.

The agreement established the responsibilities of participating organizations, the conditions of cooperation in foreign trade, pricing, etc. Organizations specializing in the production of a certain product are required to satisfy

the requirements of signatory countries with deliveries of agreed upon magnitude and according to the agreed upon schedule, and to provide products that meet the required technical specifications. Organizations not specializing in production must meet the requirements of their countries with imports of the requisite products.

Czechoslovak producers that are participating in this agreement are currently producing and delivering 200 specialized items. Deliveries of isotope production among the participating countries is showing ongoing growth while the volume of mutual deliveries between the CSSR and the USSR has reached the level of almost 1 million convertible rubles. Almost 90 percent of Czechoslovak exports of isotope production come under the terms of this agreement.

Nuclear Power and the Fuel Cycle

Just as the problem of assuring energy requirements is occupying an increasingly important place in international economic relations, so the development of nuclear power is the principal concern of CEMA member countries in the area of nuclear energy. In June 1984 the executive level economic conference of the CEMA member countries determined a strategy for the further improvement of economic cooperation among the fraternal countries, which is in turn related to an increase in public production. The conference emphasized that partner countries, in order to resolve the fuel and energy problem, must assure above all the efficient and rational use of energy resources, and likewise undertake appropriate measures in the production and mutual deliveries of fuel and energy.

An important agency for the cooperation of CEMA countries in this area is the Standing Commission of the CEMA for Electric Power, which was founded in 1956 (and which held the name prior to 1958 of Standing Commission for the Exchange of Electricity between the Member States and for the Comprehensive Use of the Water Resources of the Danube). Over the years it has been involved in the drafting of several documents related to multilateral cooperation in electric power, in the conduct of a number of research projects in the area of electricity generation, the operation of interconnected electric power systems, and environmental protection. Of the five sections on this commission, one is devoted to nuclear power.

The most important documents of the comprehensive program for the power generation sector for further improving and intensifying cooperation and for improving socialist economic integration among the CEMA member countries include:

--General Agreement on Cooperation in the Future Development of Integrated Power Systems of the CEMA Member Countries, Including the Necessary Cooperation with the Power System of Yugoslavia (dating from 1976). This agreement covers the future development of the power systems of the CEMA member countries through 1990 in practically all areas, including the integration of generation and consumption balances, the development of the sources and grid components of the integrated systems, increasing the efficiency of the production and distribution of electricity and heat, and research and development;

--Long Range Priority Programs of Cooperation [DCPS] of the CEMA Member Countries in the Areas of Energy, Fuels and Raw Materials (dating from 1978). In conjunction with the General Agreement this program includes 13 selected tasks which are the object of the joint interest of the participating countries.

The top priority in the development of the power systems in the CEMA member countries at the present time is the construction of nuclear power plants and nuclear heating plants. The installed capacity of nuclear power plants in the member countries was 26,000 megawatts in 1983 and is to be increased to 75,000 megawatts by 1990. This will represent about 20 percent of all electricity generation capacity in the countries of the socialist community. Nuclear power plants are currently operational in Bulgaria, the CSSR, Hungary, the GDR and the Soviet Union, and plant construction is under way in Cuba, Poland and Romania.

The nuclear portion of the DCPS, which constitutes the framework for cooperation among the CEMA member countries for this decade, includes:

--the construction of nuclear plants in member countries with the technical assistance of the Soviet Union;

--international specialization and cooperation in the production and joint deliveries of equipment for nuclear power plants;

--the joint construction of nuclear power plants on the territory of the Soviet Union (with the investment costs being paid back with deliveries of power).

Bilateral cooperative agreements between the Soviet Union and individual CEMA countries (Bulgaria, the CSSR, Cuba, Hungary, the GDR, Poland and Romania) are tied into multilateral cooperative agreements.

Joint Construction of Nuclear Power Plants in the USSR

In addition to the cooperation among the CEMA countries in the construction of their own nuclear power generating installations, the joint construction of such facilities in the Soviet Union itself is also very important. In 1983 operations began at the first VVER-1000 unit of the South Ukrainian Nuclear Power plant. Romania is participating with the USSR in the construction of this plant which will have an installed capacity of 4,000 megawatts when completed. Romania will receive 5 billion kilowatt hours of electricity annually as compensation for its investment outlays.

Construction is likewise entering its final phase at the Chmelnicka nuclear power plant, which also has 4 reactors with a total capacity of 4,000 megawatts. The participating countries in addition to the USSR are the CSSR, Poland and Hungary. Czechoslovak deliveries of goods and equipment valued at 235 million convertible rubles, which will be completed by the end of 1985, will be paid back over a period of 30 years with deliveries of electricity. These began in 1984 and will peak at 3.6 billion kilowatt hours annually by 1988. To provide this quantity of electricity the CSSR would have to build 600 megawatts of generating capacity with its own resources. Deliveries from this plant to Hungary and Poland will be 2.4 billion and 6 billion kilowatt hours annually respectively.

Interatomenergo

The development of nuclear power poses important tasks for the engineering industries of the CEMA member countries. These tasks must be resolved on the basis of the international division of labor, production specialization and cooperation. In addition to several bilateral agreements between the Soviet Union and other member countries that were made at the beginning of the 1970s, an important step in this direction was the establishment of the international economic association, Interatomenergo, which was created by a resolution of the 28th Session of the CEMA in 1973.

The members of Interatomenergo, which is headquartered in Moscow, are the European CEMA member countries and Yugoslavia. Among the tasks being pursued by this association are:

--the development of schedules of needs and production runs for equipment, instruments and materials for nuclear power plants;

--formulation of proposals for specialization and cooperation as well as for expanding the production of equipment, instruments and materials for nuclear power plants by the industrial sectors of the signatory countries;

--proposals for the joint planning of production of specific types of equipment, instruments and materials;

--the transmission of design and engineering data to production facilities.

Multilateral Specialization and Cooperation in the Production and Deliveries of Equipment for Nuclear Power Plants

On the basis of the General Agreement concerning Cooperation in the Future Development of Integrated Power Generation Systems of the CEMA member countries through 1990 and the Program for the Maximum Feasible Development of Nuclear Engineering Capabilities of the CEMA Member Countries, which was adopted in 1977, the Agreement Concerning Multilateral International Specialization and Cooperation in the Production and Mutual Deliveries of Nuclear Power Plant Equipment from 1981-1990 was signed in June 1979.

Under the terms of this agreement, which was signed by the presidents of the governments of Bulgaria, the CSSR, Hungary, the GDR, Poland, Romania and the USSR and a representative of the Yugoslav Government, and which contains a program for nuclear power plant construction in each of the signatory countries, each country specializes in the production of particular pieces of equipment. Czechoslovakia specializes, for instance, on reactors and steam turbines, while Bulgaria is responsible for biological shielding equipment, Hungary for water purification systems, Poland for heat exchangers, the GDR for the production of overhead cranes, Romania for main circulating pumps, and Yugoslavia for specialized armatures and pumps. The production specialization program includes 140 items and is the largest program of its kind in the world.

Construction of Nuclear Power Plants in Individual CEMA Countries

Bulgaria

In 1966 the Governments of Bulgaria and the USSR signed an agreement for the construction of the first part of the Kozloduy nuclear power plant. In 1974 this unit, with its VVER 440 reactor, was started up, and followed in 1975-1983 by three more of the same type. The fifth and sixth units of this power plant will be outfitted with the VVER-1000 reactor, so that after their completion in 1987 the Kozloduy power plant will have an installed capacity of 3,760 megawatts. Bulgaria is the first country outside of the USSR where a VVER-1000 reactor will be built.

Construction has also been started on a second nuclear power plant at Belens, with four VVER-1000 reactors. The first unit of this plant is slated to begin operations in 1991-1992.

In 1984 nuclear power plants accounted for 18 percent of the installed power generation capacity of Bulgaria, with nuclear power accounting for 28 percent of the electricity actually generated. This placed Bulgaria sixth in the world and first among the CEMA countries. In 1990 nuclear power is to account for more than 40 percent of total electricity generated.

According to the agreement among the CEMA member countries concerning multi-lateral international cooperation and specialization in the production and mutual deliveries of nuclear power plant equipment Bulgaria produces specialized pumps and armatures, biological shielding equipment and equipment for technical transportation.

CSSR

The first agreement concerning Czechoslovak-Soviet cooperation in the peaceful use of nuclear energy was signed in 1955 and set the basis for the entire Czechoslovak nuclear program, and particularly for its power generation portion. With the assistance of the Soviet Union the A1 nuclear power plant was build and made operational in 1972 with a heavy water, carbon-dioxide-cooled reactor. Because of the technical difficulties involved in the construction and operation of this type of reactor, the Czechoslovak strategy for the development of nuclear power was reevaluated in the 1970s and the decision made to switch to the proven Soviet light water reactor of the VVER series.

In 1970 the USSR and CSSR Governments agreed to cooperate on the construction of four units at the V1 and V2 nuclear power plants at Jaslovske Bohunice, with VVER-440 reactors. Similar agreements were gradually concluded for four-unit, VVER-440 power plants at Dukovany and at Mochovce, as well as for the Temelin power plant, where four VVER-1000 units will be built.

Currently three of the units at Jaslovske Bohunice are operational along with one unit at Dukovany, and their 1,760 megawatts of capacity will provide 13.5 percent of this year's total electricity consumption in the CSSR. By 1990 all 12 VVER-440 reactors are slated to be operational, and the 5,280 megawatts of

capacity are projected to provide about 30 percent of total electricity consumption. In the year 2000 the installed capacity of Czechoslovak nuclear power plants is to reach 10,280 megawatts (in addition to the units mentioned above another VVER-1000 reactor is to be built at a location soon to be named) and these facilities are to provide more than 50 percent of our electricity consumption.

The construction program for nuclear power plants in the CSSR provides for the use of these power plants as sources of heat as well. The first heat line is now being built from Jaslovske Bohunice to Trnava. It is 23 kilometers long, is designed to provide 250 megawatts of heat output, and be put into operation this year. Plans are also in place for the construction of heat lines to Hlohovce and to Leopoldov. Investment projects have already been approved or are under review for the construction of heat transmission facilities from Jaslovske Bohunice to Bratislava, from Dukovany to Brno and from Mochovce to Levice, Nitra and Tlmac. Also under study is the economic feasibility and the necessary conditions for the construction of dedicated nuclear heat sources, i.e., nuclear heating plants.

The implementation of the Czechoslovak nuclear program is placing great demands on the Czechoslovak metallurgical, engineering, electrotechnical and construction base related to nuclear power. Thanks to long term Czechoslovak-Soviet cooperation the Czechoslovak industrial base is capable of assuring deliveries of equipment for primary and secondary circuits, for reactors, volume compensators, main circulating pumps, steam generators, separators and steam preheaters, turbogenerators, etc. both for nuclear power plants built in the CSSR and for those built in other CEMA countries.

The bilateral agreement between the CSSR and the USSR on cooperation in the production of equipment for nuclear power plants, signed in March 1974, was concluded for the production of 30 subassemblies for 5 VVER-440 units. An additional agreement signed in 1976 expanded the scope of these deliveries and increased the number of turnkey VVER-440 units. At the same time the groundwork was laid for production preparations for equipment for nuclear power plants with VVER-1000 reactors. These bilateral agreements have become one of the bases for the multilateral Agreement Among CEMA Member Countries and Yugoslavia for the Production and Mutual Delivery of Nuclear Power Plant Equipment Through 1990 which was signed by government presidents of the participating countries in June 1979. The overall contract backlog for deliveries of Czechoslovak equipment for nuclear power plants in CEMA countries under this agreement now amounts to almost 1 billion convertible rubles. The CSSR is producing about 25 percent of the reactor equipment for all nuclear power plants to be started up in the CEMA between 1983 and 1990, and by 1990 it will have produced and delivered equipment for 21 VVER-440 units.

Cuba

Under intergovernmental agreements concerning economic and technical cooperation signed in April 1981 the Soviet Union is providing Cuba with technical assistance in the construction of the Juragua nuclear power plant (Cienfuegos) with a capacity of 2 x 440 megawatts. The first unit is slated to begin operation in 1987, and the second unit a year later.

This power plant is being built according to a design different from that used in other countries where VVER-440 reactors have been built. The design changes reflect the conditions at the site; a tropical climate with high atmospheric humidity, a high level of seismic activity, electrical equipment that works on 60 Hz frequency cooling with ocean water, etc.

Hungary

Construction of the Paks nuclear power plant, which has four 440 megawatt units, began in 1974. The first unit was hooked up to the grid in 1983, and the second unit will be on line in the near future. The third and fourth units are to come on line in 1987 at which time this facility will cover about 25 percent of the country's electricity requirements.

Under a multilateral agreement between the CEMA member countries and Yugoslavia concerning the production and delivery of nuclear power plant equipment Hungary is specializing in machines for exchanging fuel, electrotechnical equipment, specialized equipment for repairing components and water purification equipment.

GDR

The experimental nuclear power plant at Rheinsberg with a capacity of 70 megawatts was the first VVER type reactor built outside of the territory of the USSR and has been in operation since 1966. Between 1973 and 1979 four VVER-440 units were gradually placed in operation at the Nord industrial nuclear power plant (Bruno Leuschner) near the city of Greifswald on the shore of the Baltic. Nuclear power accounted for 12 percent of total generated electricity last year.

The program for the development of nuclear power through the year 2000 includes plans for an additional 4 VVER-440 units, currently under construction at the Nord facility. When they are completed in 1990 the installed capacity of 3,520 megawatts at this site will make it one of the largest in the CEMA. The program also anticipates using VVER-440 reactors to supply heat. Since 1983 a 22 kilometer line has been in operation from the Nord power plant to Greifswald that is capable of transmitting heat equivalent to 300 megawatts of output. During the first phase (winter 1983/84) the output of this line was 40 megawatts, and a year later this was increased to 150 megawatts.

Another step in the building of a nuclear power system is the construction of the Stendal power plant which will have 2 VVER-1000 units. The first unit should be operational in 1990.

The GDR contributes to nuclear power plant equipment deliveries within the CEMA with overhead cranes and other equipment for technical transportation.

Poland

The government approved program for nuclear power development in Poland through the year 2000 provides for the construction of nuclear power plants with a capacity of 7,860 or 9,860 megawatts, allowing the nuclear power plants to provide roughly 30 percent of electricity consumption by the year 2000.

In April 1983 a USSR-Poland agreement was signed for cooperation in the construction of the first Polish nuclear power plant at Zarnowiec with four 465 megawatt units. The first unit, on which construction began last year is slated to come on line in 1990, and the entire power plant is to be operational by 1994. Poland is providing the turbine assemblies for this power plant.

Construction will begin on a second nuclear power plant at Kujawy or a Warta in 1987. This plant will have four VVER-1000 units and is scheduled for startup in 1994. A third power plant, also with four 1000 megawatt units would have to be started in 1989, and a site for it has to be chosen by early next year.

The government program for nuclear power development also includes the production of specialized machinery and power equipment for domestic use as well as for export under multilateral cooperative agreements with other CEMA countries. Under these agreements Poland produces volume compensators for power plants built within the CEMA, steam generators and other heat exchange systems. It also produces backup diesel engines and equipment to monitor radiation safety.

Romania

In Romania two power plants are currently under construction and preliminary construction work is under way for a third unit at the Cernavoda power plant. The reactors at this power plant are CANDU Canadian reactors with a unit capacity of 660 megawatts. They are heavy water reactors with pressurized piping. Romania has shown an interest in the purchase of 10 CANDU reactors.

Under a Romania-USSR agreement signed in September 1982 the Soviet Union will assist Romania in the construction of the Moldova power plant, which will have 3 VVER-1000 units. The first unit of this power plant is expected to be operational in 1990.

Under the multilateral agreement among the CEMA member countries for the production and delivery of nuclear power plant equipment for VVER reactors Romania specializes in main circulation pumps, overhead cranes for reactor and turbine buildings, and on some equipment for the emergency cooling system.

Soviet Union

The development of nuclear power in the Soviet Union is currently based on 2 types of reactors: the VVER, a pressurized water, light water moderated and cooled reactor, and the RBMK, a graphite moderated and boiling water cooled reactor. VVER reactors also form the basis for the development of nuclear power in other CEMA countries, and 2 units are operational as well in Finland (Lovisa).

The VVER series has its origins in 2 reactors at the Novovoronezh power plant (with capacities of 210 and 365 megawatts) and in the Rheinsberg reactor (70 megawatts). These reactors served as the basis for the development of 440 megawatt and 1000 megawatt units. There are now 28 VVER reactors in service.

REMK reactors are being built only within the USSR at present. There are 17 units in service with a unit capacity of 1000 megawatts. At the end of 1983 the first 1500 megawatt unit was put into service at the Ignalina nuclear power plant.

The installed capacity of nuclear power plants in the USSR was 12,600 megawatts in 1980. An additional 24,000 to 25,000 megawatts is scheduled to be added by the end of the current 5-year plan, with nuclear power providing an estimated 220 billion kilowatt hours of electricity during this period. In 1984 nuclear power plants provided about 9 percent of total electricity generated, with an installed base of more than 27,000 megawatts. By 1990 installed nuclear power plant capacity should reach about 55,000 megawatts, with an additional 10,000 megawatts of capacity to be added annually in subsequent years.

Attention is also being paid to the use of nuclear power to generate heat. The first experiences in this area were obtained from the Belojarsk nuclear plant, with the Bilibin nuclear power plant also generating heat as well as electricity. Design work is in process for supplying heat to Kursk from the Kursk power plant and to Volgodonsk from the Rostov power plant. Odessa and Minsk will also be supplied with heat from existing nuclear power plants, Odessa from the Krymsk power plant.

A special light water reactor with a thermal output of 500 megawatts has been developed for use in nuclear heating plants, i.e., those designed exclusively to provide heat. The design of this reactor allows it to be built 2-3 kilometers from the nearest built-up section of the location to be supplied. Experimental facilities of this type are now under construction in Gorky and in Voronezh.

The USSR is also devoting considerable attention to the development of breeder reactors, the physical principle of which allows them to generate not only electricity and heat, but also new fuel for reactors that work with so-called thermal neutrons (both the VVER and REMK series are such reactors). This represents an important solution to the problem of declining uranium deposits, which have so far been the sole source of nuclear fuel. Two experimental BOR-60 breeder reactors are operational: the BN-350 reactor at Sevcenko on the shore of the Caspian Sea which, in addition to generating electricity also desalinizes sea water, and an industrial BN-600 reactor with a capacity of 600 megawatts at the Belojarsk nuclear power plant. Scientists are working on designs for breeder reactors with capacities of 800 and 1600 megawatts.

Yugoslavia

Yugoslavia also participates in the joint work of the CEMA countries in the development of nuclear power. In Yugoslavia the Soviet Union assisted in the construction of a national nuclear research facility in the late 1950s and early 1960s under a bilateral agreement. Yugoslavia is a charter member of the Joint Nuclear research Institute and participates in the activities of the Standing CEMA Commission for the Peaceful Uses of Nuclear Power.

The Krsko nuclear power plant, with a capacity of 664 megawatts has been operational since 1983. It is equipped with a pressurized water reactor from the American company, Westinghouse.

Yugoslavia produces steam separators, collectors and piping for the Soviet RBMK-1000 reactors as well as specialized armatures and pumps under the multi-lateral agreement among the CEMA countries for mutual deliveries of nuclear power plant equipment.

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BULGARIA

KOZLODUY NUCLEAR STATION SHORT OF BUILDING MATERIALS, EQUIPMENT

Explanations for Supply Problems

Sofia BULGARSKI PROFSOYUZI in Bulgarian No 4, 1985 pp 6, 7

[Article by Angel Milev: "Without Debts to Site Number One"]

[Editorial comment] Under the direction of BULGARSKI PROFSOYUZI, and in honor of the 13th Congress of the Bulgarian Communist Party, a socialist competition is taking place between the collectives completing the construction and installation work and the supply of materials for the timely completion and start-up of the fifth power block at the Kozloduy nuclear power station [AEK].

[Text] May the fifth power block, site number one in our construction, enter the ranks on time! This is now the primary task of the builders and fitters at Kozloduy, the task of workers and specialists from many enterprises of the construction and machine building industries.

The task is a responsible one, with great economic and social effects. In spite of this there are people who underestimate it. Who are they? Which posts do they occupy? How and why hamper the work?

It is difficult to answer this stream of questions in a few words. But the facts themselves throw an abundance of light on them. When we go to the builders and fitters, or we visit the enterprises, which have negotiated contracts with the AEK, the picture becomes clear.

In January and February the brigade of twice hero of socialist labor Gospodin Yordanov did not fully complete the expected construction and mounting work, because the front for its work had not been created. Apparently the blame lay with the brigade of hero of socialist labor Ivan Lichev, but he also did not fully utilize the capacity of his brigade and the possibilities of his people, since the enterprises which make large steel cells, reinforced concrete constructions and other equipment and parts had not fulfilled their contracted obligations to the complex; they broke deadlines which they themselves had accepted and signed.

The managers of all these enterprises, the divisions of the Montazhi State Economic Trust, the Stomanobetonni konstruktsii i Izdeliya Economic Combine, the Khidrostroy State Economic Trust, the Stroitelni Materiali Corporation, and of the machine construction industry reply: "the Metalsnab State Economic Trust did not ensure the supply of the necessary materials. But it is not to blame!"

Thousands of tons of iron for the concrete, high tensile steel, rolled steel, various types of sheet metal, etc., are not lost in the files of the supply organization. Where are they then? Why are they not at the site in Kozloduy or at the enterprises which are working on it? Who is responsible for this? The Metalsnab State Economic Trust and its general director Strakhil Petrov, or the general directors of the metallurgic combines in Kremikovtsi and Pernik and the cast iron foundry in Ikhtiman? Or the general directors of the construction combines and organizations, Velko Bulgaranov, Ivan Krustev, Kamen Kamenov, or...?

The vice general director of the Metalsnab State Economic Trust, Aleksandur Kashukeev, says: "We plan for what the construction organizations need, and they have a limit for this." But the builders explain: "We need everything that is necessary for developing an excellent reinforced concrete construction. If one meter of iron or 100 kilograms of cement is lacking, we cannot replace this with dry twigs or white soil."

Sheet steel is in short supply at the fifth power block, as are high quality steel and other metallurgic products. Practice reveals this. It neither covers up the truth nor forgives anyone; it always lays the blame for final results at someone's doorstep, those who stand by the lathes and machines. For example, during the first three months of this year, 1,230 tons of iron for concrete, with a diameter of eight millimeters, was needed by the Stomanobetonni Konstruktsii Economic Combine to carry out the construction program at the Kozloduy AEK and at other priority construction sites. By the middle of February the enterprise had received nothing. At the same time the Montazhi State Economic Trust was expecting 100 tons of six-millimeter sheet metal, and the Promishleno stroitelstvo State Economic Trust, more than 3,000 tons of steel for concrete.

"They will have to wait at Kozloduy," the employees of the supplying organizations say with compassion, somewhat tired of quarrels with procedures and consumers. They talk like that because they know that we cannot help them with anything. And the producers have closed the doors of their warehouses and unceremoniously announce that they can give nothing more. Perhaps we are to blame, they say, but that is the situation. But what is this situation, how did it arise, who created it? Any literate person can see: the plans for the production sections of the metallurgic combines are developed according to the full utilization of production capacities. This is most important. Second, often as a result of imprecise forecasting in one planning branch or another, unanticipated demands arise, and complying with them creates holes in supplies. Third, unexpected accidents cannot be excluded, these sometimes take out whole lines for a week or two.

But these are the minor troubles. The great, aggravating pain in supply belongs to the planning organizations which are legally responsible for the lack of correspondence in the plans affirmed for construction and limiting the materials for it; these are often unattainable, and in some cases they cannot be imported. Undoubtedly this pain, which comes from the top, reaches down to the lowest rungs and hinders the movement of the construction organism. For example, in the first three months the Promishleno Stroitelstvo State Economic Trust had a production plan, the fulfillment of which required 18,900 tons of rolled steel, but the limit determined for that goal was 12,500 tons, without taking into account the corrections made in the anticipated construction and installation work. It was necessary to save 6,400 tons of metal in three months, but how? Were there not some hidden reserves somewhere, covered with a tarpaulin in some warehouse, or was not it possible to substitute something else for the rolled steel? In this case, what would happen with the quality and reliability of industrial construction? And what would they do at such construction sites as Kozloduy, where the designer and investor can tolerate no deviation from the working designs and blueprints? Naturally, since they had no other choice, the construction organization "consumed" it from the second quarter and will end the year in the red, and striking out this debit will take a lot of time from people, wreck their accounts, and keep them on tenterhooks for long periods.

We will not comment on the objective character of certain facts, which have created such a situation. The question is not for managers of construction and other economic organizations to be forced to demonstrate unrealistic needs, or for them to make savings which can have the opposite results.

It is necessary to act more sensibly in regard to the requirements of objective economic laws for planned, proportional development. In order to do this, all material balances should speak the same language, in order to link the scope and quality of construction and fitting work with the quantity and quality of construction materials. There is room for improvement in the work of metal producers and organizations in the assignment and transport of materials to consumers. The slightest failure to anticipate reflects negatively in the metallurgic combines, even if there is time to correct it, because this influences, in a particularly strong way, the instability of supply of raw materials and the shipping of finished products. In the first half of February, at the L. I. Brezhnev Metallurgic Combine, they had around 3,000 tons of iron for concrete, and the enterprises which were making construction pieces for Kozloduy were looking for it under rocks and trees. But it could not be shipped to them, for the simple reason that cars with loose freight were freezing, and the installations which heat them up and clean them were not able to complete this work in time.

Unfortunately the dispatch of small parcels, which takes place by special vehicle transport, was slowed. In fulfilling the 39th Council of Ministers Letter, the organs of control place sanctions on those organizations and drivers who use the trucks for transport outside their rayons. And when

the Promishleno Stroitelstvo State Economic Trust was furnished with a special permission, local branches of Metalsnab in Pernik and Ikhtiman tried to guarantee that they would be free of eventual fines as freight shippers. But there is no such guarantee, and because of this 20-ton freight vehicles with trailers were forced several times to return without loads from Ikhtiman to Stara Zagora, while in Kozloduy they were waiting for the pieces.

There are worse cases. Last year three plants of the Montazhi State Economic Trust produced more than a kilometer of piping, on request of Gazstroy-Montazh in Gorna Oryakhovitsa; the tallest basketball player in the country could pass along inside the pipe, standing straight up. The collective carried out its work well, but it fell into debt, as they say, for one million leva. The AEK did not ensure a front for installing this, for all the reasons cited above. Still it had to pay for it. But according to the Regulations for the Economic Mechanism, the investor cannot pay for something he has not used. In short, the Kozloduy AEK insisted on maintaining the agreement while the production was completed, and when the partners informed them that they were ready, they started to beat a different drum, and they wondered how they would arrange the payment.

A great danger exists in starting up the fifth power block late. This is why now the major means for speeding up construction at the fifth power block of the Kozloduy AEK is to apply the economic approach everywhere, in order to move the economic levers with full advantage for site number one, to expand socialist competition with renewed vigor.

Blame Placed for Non-Fulfillment

Sofia RABOTNICHESKO DELO in Bulgarian 14 Jun 85 pp 1,3

[Article by Iliya Borisov: "Who is not Fulfilling His Obligation and Why"]

[Text] Of the anticipated 20 million leva cost of equipping the site at Kozloduy, barely 4 million leva has been spent so far on machines and equipment that have been supplied. The combine for heavy machinery in Radomir is seriously late in filling its orders, and this threatens the flow of construction and installation work. The low quality of large steel cells (SYaM) produced at the plants of the Economic Combine for Heavy Machine Building in Ruse continues to cause alarm.

The contours of the first 1,000 megawatt reactor are now taking shape. Everything is directed to one common goal: beginning the start-up operations within a year in order to include the 1,000 megawatt block in the nation's power supply system.

Among the many problems and unresolved tasks, the question of timely supply of local equipment stands out. A number of enterprises devote themselves sensitively to their responsibility and assist in the timely fulfillment of contracted agreements. The investors directorate at Kozloduy has expressed its satisfaction with the significantly improved work in securing

equipment from a number of suppliers. In one of the previous publications from this correspondent's post, critical words were directed at the Elprom-Energo Combine in Sofia, and the Vaptsarov plant in Pleven. A check has now shown that measures have been taken to overcome the delays permitted by these two suppliers. The Elprom-Energo Combine in Sofia has made up for the delay and at the end of May delivered the equipment for the first transformer. The Vaptsarov plant in Pleven also took serious measures for producing and dispatching some of the pumps. The head of the Mestni Dostavki section, engineer Metodi Teziyski, shared his satisfaction with the rapid and effective work at the Struma plant in Pernik, where a competition has been organized for timely fulfillment of orders for the fifth power block. The brigade leader has visited the site and become acquainted with the tasks which his brigade has to carry out. Recently a special team from the Sofia okrug placement-supply organization, headed by director Kiril Kurtev, visited the construction and, without any obligation, has agreed to help, by carrying out work worth more than 300,000 leva. The collective of the Narkoop in Vratsa voluntarily offered its services to furnish the new kitchen and dining hall, as well as supplying equipment worth 100,000 leva. There are other such examples, which show that enterprises that have agreed to participate in the socialist competition in honor of the Thirteenth Part Congress, directed by BULGARSKI PROFSOYUZI, have mobilized the efforts of the supply collectives for attaining this great goal.

Unfortunately, there are still many questionable actions. We should not forget that about one hundred enterprises are participating in equipping the new type 1,000 megawatt reactor. And each of them has its greater or lesser obligation. The delays are great. In the first five months of this year only four million of the anticipated 20 million leva worth of equipment has been supplied.

Once again, for the Nth time, engineer Boris Georgiev, director of the Directorate for Investor Control at the Kozloduy AEK, and other specialists and builders from Promishлено Stroitelstvo management spoke about the unsatisfactory and low quality of production of large steel cells made by the Ruse Combine for Heavy Machine Building. People in the brigade of hero of Socialist Labor Ivan Lichev are forced, through additional work and many other efforts, to correct the quality problems and bring the construction parts into compliance. Time is lost, technologies are violated, suitability and quality of construction and installation work is at risk. And what we need least of all here is to overlook these basic things! It is high time we understood that everything produced for this unique power block must be of high quality, so that it will be reliable in the future, when it is put into use.

Most alarming is the situation with supplies from the Economic Combine for Heavy Machine Building in Radomir. It must furnish three emergency hermetic locks, each of which weighs 46 tons, and the basic lock weighs 92 tons. This is 230 tons of equipment, production of which has not been started, and even less is known about when the production will be completed. Installation of the locks is designed to take place simultaneously with construction

of the reactor section. This is the cause for all the talk here of having to stop construction temporarily at a certain level. In the agreement signed by the combine in 1983, it was anticipated that fulfillment would take place at the end of that same year. Deadlines have been pushed back several times, and it now seems that they will not be kept. Again in Radomir they were supposed to produce three hydraulic locks, but as of now none has been made.

The excuses are most varied: "We have no materials, we are working on export items," "The equipment is new, that causes difficulties." Perhaps these are true, but we are talking about an order that was placed four years ago . . . Is not this sufficient time to find the correct way?

There are other gaps as well in the supplies from the plants. Not everything is in order at the investor directorate, which is sometimes slow in its agreements and the timely assurance of designs for various orders.

Taking into account the significance of this sight for resolving our power supply problem, the supplying enterprises must manifest the necessary comprehension and, with priority, on time and with high quality, develop and supply everything needed at the fifth power block. This will bring about a real contribution to setting it in operation next year and ensuring the necessary power supply for the national economy.

12334
CSO: 5100/3032

BULGARIA

KOZLODUY NUCLEAR UNITS' OPERATION EXCEED ALL CEMA RECORDS

Sofia RABOTNICHESKO DELO in Bulgarian 23 Jun 85 p 2

[Article by Iliya Borisov: "The Creation of the Atom"]

[Text] Today, power supply engineers in our nation are celebrating the holiday of the profession. During this year there have been many reasons for speaking about those who provide heat and light for our homes, for the electric energy which powers machines in hundreds of factories and plants. In today's issue, we will speak about people who have made the greatest contribution to the fulfillment of responsible assignments which the power supply engineers are solving; these people are the workers at the Kozloduy Nuclear Power Plant [SAEK].

Here the peaceful atom rages day and night. And that is how it has been for eleven years. Powerful currents of electric energy have been flowing during this time from high tension lines to the nation from Kozloduy, on the shore of the Danube. Expressed in figures, this means 30 percent of the total production in the nation. And the SAEK itself is secure and stable source of light, heat, and energy.

I asked where the action is the hottest these days. They told me that work is intensive everywhere, because there are no front lines or rear guards here. Everything has to be in order and in good shape; the processes of burning nuclear fuel in an atomic reactor are complex.

As with the other personnel, the people working at the reactor shop have carried out their duties conscientiously during the difficult winter months. Full loading was achieved during the five months of winter. The first atomic plant produced 6 billion kilowatt hours of electric power. This is a record, the best result ever in the CEMA countries which use this type of water-water reactor.

But no one is resting on his past laurels. There is no time for rest. I saw, on an illuminated board, the awe-inspiring accounts of daily, monthly, and annual production of electric power. The six-month plan has been fulfilled ahead of schedule, by 13 June. By the end of the month, the Kozloduy power supply engineers will secure half a billion more kilowatt hours than planned, a truly great success.

"The most important of these fine results in production is the timely and high-quality conduct of the repair campaign," the director of repairs, engineer

Dimitur Petrov said. "We have already finished reloading the third block. Now, on the eve of Energy Day, we have finished work on the fourth block ahead of schedule. We are getting ready for the repairs on the remaining two, so that by October we can meet the fall season fully ready."

"True commanders of the peaceful atomic front have matured during the past few years at our power plant. These are people who skillfully manage the complex production technology," reported the vice chief director, engineer Stoyno Georgiev. "Soviet specialists have helped us a lot; we work closely and cooperatively with them."

One of my most interesting sources is the plant's chief director, engineer Georgi Dichev. I remember him from the time when he first came here. A good bit of time has passed since then. Now he is burdened by years, but he works with the same passionate energy, seeking to get involved in and see everything, to help and encourage. The fruit of his restless character and creativity is strengthening scientific activity and the successful resolution of important problems in the field of scientific-technical progress.

And he is satisfied with the collective's achievements on the eve of Energy Day: "We have provided 106 million kilowatt hours of power, simply by the early completion of repairs and the reloading of the third block; that is equal to 40 thousand tons of imported coal."

Today and tomorrow, day and night, the heart of the first nuclear plant beats steadily. The peaceful atom will rage. The Kozloduy power supply engineers are aspiring to a new goal: producing 30 billion kilowatt hours of electric power this year. This is their promise in honor of the upcoming Thirteenth Party Congress. And they will be good to their word.

12334
CSO: 5100/3034

BULGARIA

NEW SCIENTIFIC-TECHNICAL METHODS DEVELOPED AT NUCLEAR POWER UNIT

Sofia RUDNICHAR in Bulgarian 13 Jun 85 pp 1,2

[Article by Nevena Markova: "Efficient Collectives"]

[Text] Great opportunities exist at the Kozloduy Nuclear Power Unit [SAEK] for implementing the achievements of scientific-technical progress and the four power blocks of the VVER-440 type which are in operation. Several program-creative collectives were created for this purpose, and they contribute to increasing the efficiency of power production.

In terms of the tasks which are being carried out in this regard, the chief director of the nuclear power plant, engineer Georgi Dichev reported:

"Efficient, creative collectives have been created to resolve our scientific-technical problems. Worthy of praise in this area is the Base for Development and Implementation, headed by engineer Radoslav Georgiev. And with its machines and technology for production, the nuclear power plant represents a solid base for technical progress here.

"Over the course of several years, we developed a sufficient number of topics linked to optimizing nuclear fuel. The results attained have a significant economic effect. Our conclusions and proposals were fully affirmed at a consultation with Soviet specialists."

During the repair campaigns this year, the four power blocks will be loaded with fresh fuel, according to a new reloading method. The economic effect, based on a unit of fuel equal in value to the savings of nuclear fuel, will reach more than 26 million leva for three reactors. This development is the work of a creative group with the following staff: engineer Nikola Alekov, and physicists Rangel Simov, Taveta Khalampieva, and Radka Milanova, led by engineer Georgi Dichev. The collective has been recognized for its inventiveness and it has been awarded a design citation.

A scientific production group led by engineer Georgi G'oshev is working successfully on problems of radio-nuclidic control at the Kozloduy SAEK.

"We already have two recognized inventions," engineer G'oshev says, "for the first time in our nation, we have implemented a new method for controlling

iodine-129. Last year we introduced a system for machine processing of data by radiation control, which significantly eases our work. By the end of 1985, we will implement a new method for cleaning liquid concentrates from the cesium radio-nuclides at the plant."

One of the tasks, which is being resolved by the program-creative collective led by Radoslav Georgiev, is linked to the problem of computerizing the operative management of the four power blocks. The program has been worked out in detail, and the necessary means have been refined; the first results are already available.

The work on robotization and mechanization of labor has also produced good results. Many mechanisms and devices have been developed and realized. The need for robotic devices for defect detection control and hermetic sealing of the steam generator pipes, however, is great. Thus the attention of many specialists has been turned in this direction.

The efforts of the Kozloduy innovators have been directed toward problems such as: increasing the technical and economic efficiency of the technological processes; implementation of avant-garde repair technologies; utilization of low-potential energy for technological media; forecasting the behavior of equipment, metallography, defect detection, etc.

There is no doubt that, working with their characteristic diligence, they will bring all this to a successful conclusion.

12334
CSO: 5100/3034

GERMAN DEMOCRATIC REPUBLIC

REVIEW OF 30-YEAR DEVELOPMENT OF NUCLEAR RESEARCH, TECHNOLOGY

East Berlin KERNENERGIE in German No 5, May 85 pp 209, 210

[K. Rambusch: "Development of Nuclear Research and Technology in the GDR"--
Dedicated to the 40th Anniversary of the Liberation from Fascism]

[Text] Ten years after the victory over fascism, the development of nuclear research and technology was begun, and thus the peaceful use of nuclear energy in the GDR.

On 28 April 1955, an "agreement on assistance by the USSR to the GDR for developing research in the field of nuclear physics and the use of nuclear energy for the economy" was concluded at government level.

In the preamble of the agreement, the great importance of using nuclear energy for peaceful purposes is particularly stressed. It was agreed that the Soviet authorities would deliver the equipment for construction of a water-water-reactor with a thermal capacity of 2,000 kW and a cyclotron for energy of 25 million electron volts for Alpha-particles, and grant further support through corresponding scientific-technical assistance and support in planning, building, assembling, adjustment and start-up, and in addition through transfer of scientific information and technical data. Complementary training of scientists, engineers and students at Soviet institutions is provided for. Furthermore, delivery of fissionable and other materials is arranged. Information and data for the reactor and the cyclotron is given gratis. Payment for equipment, materials and planning work is carried out within the framework of the existing trade agreement.

The agreement of 28 April 1955 was of very special significance for the GDR. The provisions of Control Council Law Nr. 26 of May 1946 were written especially with a view to limiting or forbidding, respectively, research and development in the fields of nuclear physics and nuclear energy. Lectures at universities and technical institutes on the "structure of matter" imparted approximately the state of knowledge as it existed in the mid-thirties and late thirties. The intellectual and material support and assistance offered by the USSR could not be overestimated. The GDR had to expend great efforts and funds in order to utilize the proffered help and support for direct promotion of scientific-technical research. It is characteristic of SED policy and the work of the GDR government that the numerous

prerequisites for utilizing the proffered possibilities were created on such a large scale and during a relatively short timespan.

After intensive preliminary work and clarification of a great number of personnel questions, on 11 November 1955, the GDR Council of Ministers passed resolutions on the formation of a scientific council for the peaceful application of nuclear energy and on the founding of an office for nuclear research and nuclear technology.

The "Scientific Council for the Peaceful Application of Nuclear Energy" was composed of representatives of the party, the government, and scientists. Prof Dr Gustav Hertz was appointed chairman. The chairman of the Council of Ministers appointed the chairman and members of the scientific council. The scientific council was to advise the Council of Ministers on all questions of peaceful use of nuclear energy. The necessary basis was created through the formation of special commissions, and extraordinarily great and valuable work was carried out which was of great importance when newly founded institutes and plants took up their work.

The Office for Nuclear Technology and Nuclear Research, a state central leadership organ operating under the direct control of the Council of Ministers, was responsible for promotion, coordination and control of all work in the fields mentioned; it had to work out and instigate long-term planning and carry out the necessary coordination with the ministries and central institutions.

On 1 January 1956, the Central Institute for Nuclear Physics was founded. After considerable construction, assembly and installation work, on 16 December 1957 the 2-MW (th) research reactor supplied by the USSR was started up in this institute, and the cyclotron became operational on 1 August 1958. A special achievement during the initial phase of the institute was the drafting and construction of the Rossendorf ring zone research reactor which became available for research tasks by the end of 1962.

Additional institutes for nuclear research and nuclear technology were founded in the early years, which started research work very soon, such as the institutes for

1. applied physics of purest materials by the Ministry for Ore Mining and Metallurgy,
2. physical mass transfer (now the Central Institute for Isotope and Radiation Research),
3. applied radioactivity by the Ministry for Chemical Industry,
4. research into dust and radioactive floating particles by the Office for Nuclear Research and Nuclear Technology.

In November 1955, the department for nuclear technology, founded within the framework of the Technical University of Dresden, began training students

in the specialized fields of nuclear physics, radiochemistry, nuclear energy and actinometry. The installations necessary for this training had also been constructed in a very short time.

Also of great importance was the founding of the state-owned Vakutronik plant, Dresden, in 1956. This enterprise developed and produced measuring instruments and special installations for nuclear physics, and essentially managed to supply the rapidly growing demand in ensuing years. Today, this enterprise is part of the state-owned combine Messelektronik. It must also be mentioned that the state enterprises Carl Zeiss Jena, Transformatoren und Roentgenwerk Dresden, Laborbau Dresden, Rathenower Optische Werke and others were already actively at work by 1956/57 within the framework of nuclear research and nuclear technology.

The use of radioactive and stable isotopes in applied research, medicine, and in many forms in industry, was achieved to an astonishing degree. It was made possible through the cooperation of the institutes and enterprises mentioned above.

The agreement of 29 April 1955 was the basis for further agreements and arrangements which in the ensuing years were concluded between the governments of the GDR and the USSR, central state authorities, scientific institutes and enterprise, respectively. The agreement on granting technical assistance in the construction of the first GDR nuclear power plant must be cited as one of the most important ones. This agreement made it possible for extensive work to be organized and begun in the research institutions and industry for use of nuclear energy in the production of electric energy. A Scientific-Technical Office for Reactor Construction was founded in 1958 in order to use the proffered assistance and to initiate and carry out the necessary development and research work. Taking on construction and planning work for the first GDR nuclear power plant necessitated expansion leading to the formation of an enterprise which, as of 1962, became responsible for the preparation, projection, construction, start-up and operation of the Rheinsberg nuclear power plant.

In 1962, the Office for Nuclear Research and Nuclear Technology was dissolved. By merging the research establishments of the office with the Academy of Sciences of the GDR, by integrating the enterprises in the respective economic units, and by forming the "State Center for Radiation Protection," which later became the State Office for Nuclear Safety and Radiation Protection of the GDR, it was possible to preserve the valuable results and work experience in nuclear research and technology and to work on the ensuing tasks within the respective institutions. Consequently, the department for nuclear technology of the Technical University of Dresden was also dissolved and the special installations and institutions were merged with the regular departments.

The tasks and work of the "Scientific Council for Peaceful Use of Nuclear Energy" were transferred to the Research Council of the GDR.

When the Rheinsberg nuclear power plant became operational in May of 1966, the first phase of development and organization, recognition of the tasks and expenditures for the future use of nuclear energy for production of electric energy, was concluded.

The next phase was determined by the "agreement of 14 July 1965 between the government of the GDR and the government of the USSR on the expansion of cooperation in the construction of nuclear power plants in the GDR."

That agreement, and appropriate amendments, deals with the construction of the Nord nuclear power plant and regulates the services, deliveries and obligations of the partners to the agreement. In accordance with the declared intentions of the agreement, after a 4-year construction period the first stage of the power plant with 440 MW (e) was put into test operation in December 1973, followed by the second unit in 1974. At present, the nuclear power plants constructed and operating in the GDR provide more than 11 percent of the electric energy produced. Their share of the republic's installed capacity amounts to a little more than 8 percent. In the coming years, the fifth through eighth units of the Nord nuclear power plant will begin operation with 440 MW (e) each, so that the final capacity of the power plant will reach 3,520 MW (e). The Stendal nuclear power plant with 4 reactors of 1,000 MW (e) each will begin operation according to the government's stipulations. Training of expert personnel for development, planning, construction, start-up, operation and maintenance is being carried out at the Technical University of Dresden and the Engineering Institute in Zittau. In 1978 and 1979 respectively, these institutes of higher learning managed to make teaching and research reactors operational based on their own designs.

The state and economic institutions necessary for peaceful use of nuclear energy are integrated in the socialist state structure of the GDR.

The Council of Ministers of the GDR determines development goals and construction stages of the nuclear power plants. The resolutions of the Council of Ministers passed at the end of 1983 contain the tasks for the coming years and clarify the prospective development of peaceful use of nuclear energy.

The state planning commission and the GDR ministries are responsible for the balance sheet and execution of the resolutions. Implementation is carried out by the combines and foreign trade enterprises under the ministries, and by the Academy of Sciences. The combine Kraftwerksanlagenbau, Berlin, for example, must assume the general contractorship for the construction of nuclear power plants. This task comprises the preparation, planning, and coordination of work for construction of the installation, including their own performance in providing equipment and assembly work, start-up and test operation. The general contractor is responsible for maintaining safety regulations and must provide proof of the nuclear safety of the nuclear power plant.

The tested installation is given (sold) to the state combine Kernkraftwerke "Bruno Leuschner," Greifswald. This combine, as principal investor is responsible for providing the investment funds, details of the order, the construction site, integration of a nuclear power plant in the planned territory, and obtaining from the Office for Nuclear Safety and Radiation Protection the coordination and permits necessary for construction. The Kernkraftwerke combine is also responsible for the plant, compliance with the very strict regulations on operation and control, procurement of nuclear fuel, maintenance and necessary repairs.

It behooves us to remember that the victory over fascism in 1945 was the basic event for the peaceful use of nuclear energy and the 30-year development of nuclear research and nuclear technology in the GDR, and that during the entire period active assistance and support was granted by the USSR.

9917
CSO: 5100/3033

INTER-AMERICAN AFFAIRS

BRIEFS

NUCLEAR TESTS DENOUNCED--Quito, 29 Jun (DPA)--The South Pacific Permanent Commission, with the mandate of Colombia, Chile, Ecuador and Peru, today denounced the increase in French nuclear tests on the Mururoa Atoll saying that there have been four in less than 6 months. According to the commission, the explosions took place on 1 and 9 May and 4 and 8 June of this year, as compared with only three tests in 1984. The four explosions this year bring to 70 the number of nuclear tests carried out by France since 1960, when it began testing atomic devices on the Mururoa Atoll in the South Pacific between Tahiti and Easter Island. The commission, an intergovernmental organization based in Quito, also stated that "France has ignored the protests of the Pacific Basin countries." It added that the nuclear explosions seriously damage marine resources in the South Pacific. The explosions are detected by seismographers in New Zealand and Australia and reported to the Pacific Basin countries.
[Text] [Hamburg DPA in Spanish 1538 GMT 29 Jun 85]

CSO: 5100/2132

ARGENTINA

COSTANTINI: NUCLEAR POLICY IS NOT IN CRISIS

Buenos Aires CLARIN in Spanish 2 Jun 85 p 16

[Text] The head of the National Commission for Atomic Energy (CNEA), Alberto Costantini, said yesterday in Bariloche that "the Argentine nuclear policy is not in crisis," although he admitted that the advances in connection with the nuclear electric power plants will be limited for the time being "to the realm of concrete realities."

In outlining that body's current policy, he explained that scientific research, the training of professional workers and the uses of nuclear energy for peaceful purposes, such as their application in medicine and industrial development, "should be regarded from now on as priority aspects of our administration."

He commented on the current situation in the development of atomic energy in Argentina and its future prospects on the day after the main sessions commemorating the 35th anniversary of the founding of the CNEA were held in this city, coinciding with National Atomic Energy Day and the 30th anniversary of the founding of the Balseiro Institute. President Raul Alfonsin attended the ceremonies.

Costantini admitted that the delay in the approval of the budget for this year is having a negative effect on the continuation of the projects undertaken by the CNEA, because of their high financial cost.

"We hope," he went on to add, "that nuclear energy will not become a factor in state power, but that it will instead be placed in the service of mankind." He noted by way of example the application of radioisotopes in medicine, biology and genetics.

No Consensus

He went on to explain that the presence of his Latin American colleagues at the ceremonies held at the Bariloche Atomic Center "should be regarded as a regional reaffirmation of the peaceful uses of atomic energy," despite the fact that the delegates were not able to reach agreement on a document to be signed to this effect.

On the other hand, some representatives regarded Costantini's meeting with the heads of other Latin American nuclear commissions as really being a kind of preparatory session for the scheduled November meeting of the Inter-American Nuclear Energy Committee, a body under the jurisdiction of the OAS. In answer to a question, Costantini said that both with regard to the nuclear power plants, "which are today providing about 11 percent of our domestic electrical production," and the fuel cycle, the advances will be limited "for the time being to the realm of concrete reality."

5157

CSO: 5100/2134

ARGENTINA

BRIBERY CHARGE RELATED TO NUCLEAR REACTOR SAID CONFIRMED

Buenos Aires CLARIN in Spanish 13 Jun 85 p 25

[Text] The head of the National Administrative Investigations Supervisory Board, Ricardo Molinas, has obtained evidence from Swiss banks, with the assistance of the court system in that country, proving the payment of \$4 million to the late Jose Gelbard, who served as minister of economy under Hector Campora and Juan Peron, by foreign enterprises interested in the installation of a nuclear reactor at the Rio Tercero reservoir in the province of Cordoba, which occurred in 1973.

Molinas issued a statement entitled "A Serious Transaction Clarified" yesterday, in which he stated that Italimpianti, an Italian enterprise, and Atomic Energy of Canada Limited, a Canadian enterprise, paid that sum into the Opera account established by Gelbard at the Trade Development Bank in Geneva. These funds were later transferred to other personal accounts maintained by this official.

The evidence mentioned by Molinas was obtained thanks to the timely investigation launched by the body he heads during the administration of Sadi Conrado Massue, and headed by Deputy Prosecutor Antonio Luis Beruti, into the irregular payment to third persons of a substantial "commission," which at the time led to a parliamentary investigation in Canada.

According to the document released by Prosecutor Molinas, the matter ended in the obtaining of specific information from the Swiss bank concerning the ownership of the account in which these funds were deposited.

Molinas said that the records of judicial proceedings by the Swiss state were obtained through the Foreign Ministry in connection with Case No 3693, currently being handled by Federal Judge Miguel Pons, to whom it was turned over by the National Administrative Investigations Supervisory Board.

The Swiss Republic and the Canton of Geneva definitely confirmed the ownership of the Opera account at the Trade Development Bank in Geneva, to which the greater part of the funds paid out by the supply enterprises Italimpianti and Atomic Energy of Canada Limited was deposited.

The prosecutor added that "the long and persistent efforts pursued by the federal court and this supervisory board, in which connection they had the needed support of our Ministry of Foreign Relations, fully confirmed the suspicion of graft, in which connection the board will initiate court proceedings.

As a result of the reports received in July of 1983, the statement released goes on to say, charges were filed in a court of the first instance in the city of Geneva, which handed down a judgment in favor of the petition by the Argentine court authorities.

After various appeals filed by the heirs to the account holder, now deceased, had been heard, the court in Lausanne, Switzerland, made a final ruling on the case, ordering that the information requested be provided.

According to the records on the case, Molinas went on to say, Jose Gelbard established a regular account identified as "Opera" at the Trade Development Bank on 24 November 1972, and maintained that account until 23 September 1976.

On 2 May 1974, the sum of US\$2.5 million was transferred to that account from the Swiss-Italian Bank in Lugano, and a little later, on 27 May, another US\$1.2 million was transferred to the account from the Italian Commercial Bank in Genoa, on the orders of Italimpianti, in connection with the expenditures pertaining to the nuclear power plant in Cordoba.

On 26 March 1976, finally, the Opera account was credited with US\$300,000, also transferred from the Swiss-Italian Bank. Molinas added that "in accordance with the instructions of said Jose Ber Gelbard," the funds in question "were transferred from the Opera account to Account No 24777/AB, which Gelbard had established at the Trade Development Bank 2 years earlier.

This latter account was closed on 30 September 1974, the balance being transferred to a new account known as "Gidul," in the name of Jose Gelbard and members of his family. That account, in turn, was closed on 9 April 1976, the prosecutor said.

5157
CSO: 5100/2134

ARGENTINA

'SMALL' NUCLEAR POWER CENTER PLANNED IN CORDOBA

PY210002 Buenos Aires TELAM in Spanish 0054 GMT 28 Jul 85

[Text] Cordoba, 17 Jul (TELAM) — National Atomic Energy Commission (CNEA) President Alberto Costantini announced here tonight that the CNEA has decided to build a small nuclear power center in Embalse, 110 km south of this city. The center will comprise two plants, which will produce cobalt-60 and radioisotopes, and a 15-mw reactor, and will cost approximately \$40 million. This important project will be supplemented by the laboratories and the infrastructure necessary for this type of plant, which will be similar to CNEA centers in Ezeiza, Constituyentes, and Bariloche, he said.

Costantini released this information at a press conference during a meeting at Government House. The meeting was attended by Provincial Governor Eduardo Cesar Angeloz, provincial government officials, and CNEA technicians.

Costantini said the CNEA decided to build the center in Cordoba not only because of the governor's considerable efforts to have it built in his own province, but also because of the importance the local industry has given to quality control processes, particularly in the aircraft and automobile industries.

He added that the CNEA has also taken into account the high quality of the local university, and said the CNEA will grant scholarships to professionals wishing to specialize in nuclear science at CNEA's Balseiro Institute, in Bariloche.

The technicians who developed the so-called Cobalt-60 Project reported the technical details. They said the center will manufacture sealed source material for internal consumption and for export. By the end of the third year, the income generated by sales of this material will have returned the initial investment, they said.

As for the radioisotope production reactor, they reported that it will produce material for medical and industrial use, and that it will be used to separate primary radioisotopes and carry out nuclear and biological control processes.

After explaining that the center will be built in the vicinity of the Embalse Nuclear Plant, the technicians said the implementation of the project might begin by the end of the year and that its completion would take approximately 5 years. They pointed out that it will be financed with the CNEA's own resources.

CSO: 5100/2146

ARGENTINA

BRIEFS

CNEA RESIGNATIONS--Buenos Aires, 23 Jul (NA)--It was learned today from reliable sources that two directors, a manager, and a specialist in nuclear plants, in addition to researchers and technicians, have in recent weeks resigned their posts at the National Atomic Energy Commission [CNEA] and most of them have left the country to seek better job opportunities. Among the most recent resignations at the CNEA are those of Jorge Bertoni, director for nuclear plants, who went to work abroad; and that of Alejandro Placer, director for planning, coordination, and control, who was hired by the International Atomic Energy Agency (IAEA) to work in its Vienna headquarters. Jorge Coll, former president of the Argentine Nuclear Enterprise for Electrical Power Plants (ENACE), which is subordinate to the CNEA, has also resigned and joined the IAEA. The resignation of Aristides Dominquez as manager for human resources stands out among other resignations reported at the CNEA in recent weeks. The CNEA faced a crisis in August 1984, when most of its directors tendered their resignations to CNEA President Alberto Constantini, who did not accept them. The departure from the country of CNEA experts is taking place at a time when the government is making efforts to repatriate Argentine scientists residing abroad. [Text] [Buenos Aires NOTICIAS ARGENTINAS in Spanish 2050 GMT 23 Jul 85 PY]

LAPENA ON NUCLEAR ENERGY--Buenos Aires, 23 Jul (NA)--Jorge Lapena, under secretary for energy planning, today stated that "nuclear energy will not play a major role in the production of electricity in the next 20 years," and admitted that "there is now an oversupply of electricity as a result of the drop experienced by the Argentine gross domestic product [GDP] in the past decade." Lapena made this statement in a luncheon given by the Petroleum Club at the Plaza Hotel. The luncheon was attended by Shell Vice President Paez Allende, Esso Vice President German Salazar, Bridas representative Alejandro Bulgheroni, and others. Lapena said the drop in the demand for electricity "stems from the zero growth of the Argentine GDP during the past decade due to a regression of the Argentine economy." Lapena said that at present hydroelectrical power accounts for 45 percent of the national power resources and that nuclear plants only supply 11.5 percent of the electricity used in the nation. He announced that natural gas will have to be used in the future for the production of electricity. Lapena noted that "there is now a short supply of gas due to our inadequate pipeline systems," and that there was a 5 percent drop in the production of oil during the first half of 1985 compared to the same period of 1984. In this regard, Lapena said that "the level

of oil reserves remains unchanged" and warned that "if a serious effort is not made in this sector, Argentina will no longer be able to have sufficient oil for its own consumption." [Excerpt] [Buenos Aires NOTICIAS ARGENTINAS in Spanish 2008 GMT 23 Jul 85 PY]

NUCLEAR SCIENTISTS' EXODUS DENIED--Buenos Aires, 24 Jul (TELAM)--The National Atomic Energy Commission [CNEA] today denied press reports that two CNEA directors have decided to leave the country in an alleged exodus. The CNEA reported that the two scientists are enjoying a leave without pay to work for the International Atomic Energy Agency, a normal activity. In a communique, the CNEA stated that proof of this is the recent return to the country of an Argentine expert, who now holds the post of director of planning, coordination, and control. Moreover, these scientists had already spent lengthy periods abroad, either on missions or contracts authorized by previous governments. The CNEA adds that hundreds of scientists and technicians are abroad updating and increasing their knowledge and providing their expertise and experience to the country through this commission, without accepting posts in nuclear organizations of other countries, thus maintaining and increasing the outstanding Argentine position in the nuclear field. The CNEA communique concluded by saying that a similar situation is occurring with an expert in chemistry and a CNEA director. [Text] [Buenos Aires TELAM in Spanish 0514 GMT 24 Jul 85 PY]

CSO: 5100/2149

BRAZIL

COMMENTATOR VIEWS REAGAN-GORBACHEV MEETING

PY100345 Sao Paulo Radio Bandeirantes Network in Portuguese 0230 GMT
10 Jul 85

[Commentary by Newton Carlos]

[Text] There are great expectations throughout the world, but especially in Europe and the United States, regarding the preparations for the summit conference between U.S. President Ronald Reagan and the new Soviet leader Mikhail Gorbachev.

This conference will be held in November, but Gorbachev's strategy has already been established. He will reportedly try to convince Reagan that the detente experience of the 1970's must be exploited, not only to establish detente, but to make it more dynamic and to have it function as an instrument capable of changing a world armed to the teeth into an international security system.

However, the Soviets have imposed a condition: Strategic balance must prevail. Both Soviet and U.S. arsenals should have equal destructive power. This is the main reason for the Soviets to demand that the U.S. star war program be pigeonholed. They claim that this program is destabilizing, and that it upsets the strategic balance achieved with great sacrifice by the Soviets.

CSO: 5100/2142

BRAZIL

PUGWASH MEETING CABLES SARNEY, REAGAN, GORBACHEV

PY112143 Rio de Janeiro O GLOBO in Portuguese 10 Jul 85 p 19

[Text] Campinas, Sao Paulo--Hundred scientists from 60 countries who participated in the week-long 35th meeting of the Pugwash Movement have sent a telegram to President Jose Sarney suggesting that Brazil and Argentina sign a pact restricting nuclear development in Latin America, and that all countries of the continent support the Tlatelolco Treaty. The scientists also sent telegrams to U.S. President Ronald Reagan, and to CPSU Central Committee General Secretary Mikhail Gorbachev asking them to examine at their November summit not only the problems that affect the two major powers in particular, but also those that affect all the continents.

Copies of the document written at the Pugwash Movement meeting are being mailed to Sarney, Reagan, and Gorbachev. In the document, the scientists question the proliferation of nuclear weapons, the arms race in Latin America, the foreign debt as a factor of social and political instability, the Malvinas issue, and the problems in southern Africa.

CSO: 5100/2142

BRAZIL

FRG MINISTER URGES CONSTRUCTION OF SECOND NUCLEAR PLANT

LD270909 Hamburg DPA in German 2239 GMT 26 Jul 85

[Excerpts] Sao Paulo, 26 Jul (DPA) -- Federal Minister for Economic Cooperation Juergen Warnke has called on Brazil to change its protective policy on the information technology industry. At the end of his 4-day visit to Brazil today, Warnke described the protective measures to the press in Sao Paulo as a mistaken legislative decision. He hoped Brazil would amend it. The law on information technology forbids foreign firms from producing microelectronics products in Brazil.

Warnke said the law on information technology hampered new German investment in Brazil. In order to bring foreign investment to Brazil the country should also make it clear that it intends to pay its debts. Warnke suggested to the Brazilians that not just one, but two, nuclear power stations should be set up in cooperation with German industry. Until now it was only certain that the Brazilian Government would complete one German nuclear power station (Angra Two). The German-Brazilian nuclear treaty concluded in 1975 originally planned for the construction of eight German nuclear power stations. Due to its economic and financial crisis however, Brazil has no more money to carry out these plans. Warnke flew from Sao Paulo to Peru for a several-day visit.

CSO: 5100/2155

BRAZIL

GOVERNMENT TO REVIEW NUCLEAR AGREEMENT WITH FRG

PY160236 Rio de Janeiro O GLOBO in Portuguese 12 Jul 85 p 17

[Text] Mines and Energy Minister Aureliano Chavez yesterday announced that the Brazilian nuclear program and the construction of more than five nuclear plants, established in an agreement with the FRG, will be reviewed by a high-level commission made up of representatives of the government and the Brazilian scientific community.

After meeting with President Jose Sarney at Planalto Palace, Aureliano Chavez reported that the nuclear program will be reexamined in view of the country's economic situation.

The commission, to be established in the next few days, will be coordinated by the Mines and Energy Ministry and will have 120 days to make the study. According to the mines and energy minister, one point has already been decided: The investment in the nuclear program will be reduced but the Angra II and III nuclear plants must be concluded.

CSO: 5100/2143

BRAZIL

SETUBAL QUESTIONS USSR'S NUCLEAR TEST SUSPENSION

PY302336 Paris AFP in Spanish 2205 GMT 30 Jul 85

[Text] Brasilia, 30 Jul (AFP) -- Brazilian Foreign Minister Olavo Setubal today expressed an implicit doubt regarding the suspension of nuclear tests proposed by the USSR, because there is a lack of knowledge regarding the effects of the explosions that are carried out for peaceful purposes. Setubal granted a press conference today, upon arriving at the Brasilia Air Force Base on his return from Lima, where he participated in the inaugural ceremonies of the new Peruvian president, Alan Garcia.

Mikhail Gorbachev, the secretary general of the USSR Communist Party, has announced a unilateral suspension of nuclear tests as of 6 August 1985 and has invited the United States to adopt a similar position. The United States has rejected the Soviet offer.

Setubal believes that the measure must be studied from a technical viewpoint. At this time, and without consulting experts, I cannot say whether that measure will contribute to the peaceful development of nuclear energy, Setubal added.

Brazil has not adhered to the Non-Proliferation of Nuclear Arms Treaty because it considers it to be discriminatory, but has signed the Tlatelolco Treaty that denuclearizes Latin America, although Brazil has not yet ratified it.

The foreign minister highlighted President Francois Mitterrand's reply to a letter that was addressed to all the chiefs of state of industrialized nations by Uruguayan Foreign Minister Enrique Iglesias in his role as secretary pro tempore of the Cartagena Consensus. In the letter Iglesias asks for the understanding of the industrialized nations regarding the economic problems of Latin America. The French president's answer was one of understanding, Setubal said. The other answers were conventional.

Setubal also indicated that Argentina, Brazil, Peru, and Uruguay have offered more cooperation to the Contadora Group and its efforts to achieve peace in Latin America.

CSO: 5100/2155

BRAZIL

URANIUM TO BE ENRICHED BY JET-NOZZLE PROCESS BY 1989

PY311814 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 24 Jul 85 p 21

[Text] Rio de Janeiro -- Nuclebras president Licinio Seabra stated yesterday that by early 1989, Brazil will be in a position to enrich uranium through the jet-nozzle process, and will then be able to assess the country's interest, taking into account that this is the most expensive process.

After lecturing to officers of the Naval War School, Seabra stated that NUCLEI [Nuclebras Isotope Enrichment, Inc.], a Nuclebras subsidiary, "is mounting the first pilot cascade which is already being mounted on an industrial scale, so as to assess the performance of the jet-nozzle process for enriching uranium isotopes."

"This is the first stage of the pilot plant. We are in the final stage of that plant, which will begin operating in the second half of 1986. Then we will have an observation period of 1 or 1 1/2 years, in order to be able to make an assessment afterwards of all the aspects of the operations system," Seabra added.

He admitted that the "jet-nozzle process is the most advanced system for the enrichment of uranium, but it is more expensive than the other two systems available today in those countries that have already obtained the enrichment process." According to Seabra, the countries that have it "do not want to transfer them to Brazil or other countries."

The Nuclebras president added that should a decision be made to install the enrichment process at industrial level, a period of 3 years would be needed for the production of enriched uranium and for other investments.

"But this is a decision that has not yet been made and it will depend on a strategic assessment that could be made upon the conclusion of the first stage of the pilot plant, which could take place by the end of 1988 or the beginning of 1989," Seabra stated.

Without taking a position for or against the continuation of the nuclear plant Angra III, (it has been paralyzed), the Nuclebras president stated that \$500 million were already invested in that project.

Seabra added that he has kept the copy to O ESTADO DE SAO PAULO to read the report in which the German magazine DER SPIEGEL reports that the nuclear agreement

signed by Brazil 10 years ago with the FRG resulted "in nothing for Brazil," and that he is going to read it at night. He said that the agreement already allowed for the training of Brazilian experts, whether engineers or technicians, and cited NUCLEP [Nuclebras Heavy Equipment, Inc.], another subsidiary of Nuclebras, as one of the positive results of the agreement. He also cited the fact that NUCLEP has own the bid for the construction of Argentina's Atucha, Nuclear Plant and NUCLEP's participation in the bids called for by Egypt and Turkey for the production of nuclear reactions in association with the German Kraftwerk Union.

CSO: 5100/2158/F

BRAZIL

ANNUAL REPORT OF IPT OF SAO PAULO

Sao Paulo GAZETA MERCANTIL in Portuguese 22 Apr 85 p 27

[Text] Sao Paulo Institute of Technological Research, S. A. (IPT)

Board of Directors: Milton Vargas, president; Victor Manoel de Souza Lima, vice president; Talmir Canuto Costa, Aerospace Technical Center, Ministry of Air; Naval Commander Jorge Pinheiro da Costa Veiga, Naval Engineering Board, Ministry of Navy; Hessel Horacio Cherkasski, Secretariat of Industry, Commerce, Science and Technology; Jose Ephim Mindlin, Sao Paulo State Federation of Industry; Saul Goncalves d'Avilla, Secretariat of Industry, Commerce, Science and Technology; Plinio Oswaldo Assmann, Engineering Institute; Walter Borzani, State Science and Technology Council; Jose Rossi Junior, Secretariat of Industry, Commerce, Science and Technology; Celso Pinto Ferraz, Secretariat of Industry, Commerce, Science and Technology; and Clovis Bradaschia, University of Sao Paulo Polytechnical School.

Supervisory Board: Vilmar Evangelista Faria, Eduardo Pinheiro Gondin Vasconcelos, and Luis Antonio Siquiera Reis Dias.

Executive Board: Dr Milton Vargas, president; Dr Victor Manoel de Souza Lima, vice president; Dr Alberto Pereira de Castro, superintendent; Dr Carlos de Souza Pinto; and Dr Paulo Cesar Leone.

Message to the Stockholders and the Public

In 1984, the attention of the Executive Board of the IPT was focused on the maintenance of the human and material assets of the institute, for the purpose of safeguarding them with a view to more effective technological support of Brazilian industry in this developing phase.

At the end of the year, the IPT had 746 researchers, 1,038 technicians, 694 administrative employees and 208 assistants, making a total of 2,686 permanent employees, 1,120 of them with university level education.

During the year, 26 completed their masters programs and six obtained doctorates, such that by the end of the year 172 technicians had postgraduate training. The apprenticeship program accepted 432 university students.

However, the IPT lost 50 university-level technicians, basically for salary reasons, and fears the loss of some others. This development has weakened its chief asset, which took years to train and has cost the institute and state so much.

In accordance with State Law 3741, the employee participation system was established, such that this group has a representative on the board.

As to the physical assets, the investment of resources continued to be limited, falling far below the minimal requirements and even threatening the maintenance of some laboratories. The total expenditures came to 2,649,000,000 cruzeiros, including state subsidies and specific financing, mainly from the FINEP [Funding Authority for Studies and Projects].

Despite the recessive atmosphere, the IPT received contracts for the execution of 354 new projects, and at the end of the year, it had 455 projects under way, in addition to having completed thousands of tests and analyses in its 89 laboratories.

The income obtained from services rendered came to 30.6 billion cruzeiros. Of this total, 15 percent pertained to services rendered to the Secretariat of Industry, Science, Commerce and Technology (SICCT), 14 percent to services rendered to other state administrative bodies, 32 percent to services rendered to federal administrative bodies, 2 percent to services rendered to municipal administrations, 2 percent to services rendered to the bodies of other states in the federation, 30.5 percent to services rendered to private enterprise, and 3.5 percent to minor and miscellaneous services. Thus a percentage increase in contracts with private bodies was noted, since in earlier years they accounted for 20 percent of the income.

The SICCT projects were focused on the priorities of that body, in connection with domestic technology for enterprises, support of micro, small and average enterprises, support of the municipalities, alternative energy sources and development of the mineral sector.

Among the projects carried out for Sao Paulo state government bodies, special mention is merited by those done for the CESP [Sao Paulo Electric Power Plants, Inc.], ELETROPAULO, SABESP, DER [Highway Department], DAEE [Water and Electric Power Department] and METRO. Important work for the federal government included that done for PETROBRAS [Brazilian Petroleum Corporation], PETROMISA, Rio Doce Valley Company, RFFSA, ALBRAS [Brazilian Aluminum, Inc.], EBTU [Brazilian Urban Transportation Company], COSIPA [Sao Paulo Iron and Steel Company], ELETRONORTE [Northern Electric Power Plants], NUCLEBRAS [Brazilian Nuclear Corporations, Inc.], NBH [National Housing Bank], IBDF [Brazilian Forestry Development Institute], SUDHEVEA [Superintendency of the Rubber Industry], EMBRATEL [Brazilian Telecommunications Company], EMBRAPA [Brazilian Agriculture and Livestock Research Enterprise, the Ministries of Navy, Army and Air, and the FINEP. This latter agency has confirmed its position as the main financer of IPT projects, with nine contracts. Outstanding among these are the work pertaining to the Program for Aid to Industry in Energy Conservation, with the participation of the National Council for Petroleum and the FIESP [Sao Paulo State Federation of

Industries], and, with PME-FINEP resources, continuation of the babacu palm development project at the Teresina experimental unit in Piaui. The IPT projects also obtained financial support from the STI [Secretariat for Industrial Technology]-MIC [Ministry of Industry and Commerce], the FIPEC of the Bank of Brazil and the PADCT [Support Program for Scientific and Technological Development], and, in the international sector, from the Itamaraty Palace, the SUBIN and the FUNDAP.

For the municipal government, projects involving low-cost paving, soil use, assessment of housing complexes, hydraulic earth-filling and the use of reforestation woods for low-cost housing were carried out. Projects for other state governments were executed in Parana, Rio de Janeiro and Goias, in addition to other services rendered in various regions of Brazil.

In the private sector, the work done was focused on three main areas: nationalization of equipment, components and materials, development projects, and technological support. Notable work was done in blast welding, precision casting, the production of metal powders and parts of aluminum oxide and aluminous porcelain, the production of odometers, extra-soft steel, cast iron parts with a high silicon content, wood processing, instrumentation equipment, the use of niobium in alloys, description of magnetite rejection, the uses of aluminum in medium-sized vessels, the handling of propellants, off-shore platforms, continuous biodigestion, rust-resistant materials, tempering glass, microcomputer hardware, the development of catalysts, geotechnics, the monitoring of drilling and setting of stakes, the cementing of oil wells, the testing of railroad parts and various tests on metals. With the participation of the INPI [National Institute of Industrial Property], the development contracts with Eternit and Sama were continued, and a similar contract was signed with Pirelli.

Also in 1984, the institute published 34 periodicals and 246 serial publications. It organized nine seminars and symposiums in which about 700 individuals participated. The Specifications Section received about 19,000 inquiries concerning its archive of about 230,000 technical norms, and, finally, the library received 7500 requests for information from businesses interested in subjects related to technology. The institute applied for 11 new patents and another three were granted by the INPI, all of them pertaining to technological innovation projects.

As to the economic and financial aspect, the operational results for 1984 can be summarized in the following figures:

	<u>Millions of Cruzeiros</u>
Net recorded operational income	38,943
Subsidy from state government	29,823
Net recorded operational expenditures	75,695
Operational deficit	6,927

If the expenditures of the Paulipetro Consortium, totaling 8,315,000,000 cruzeiros, are deducted, and a comparison is made with the past 2 years, we have:

	Millions of Cruzeiros		
	<u>1982</u>	<u>1983</u>	<u>1984</u>
Own income	9,726	14,414	30,628
State subsidy	4,006	9,743	29,823
Operational expenditures	14,142	26,927	67,380

With the deduction of 3.94 billion cruzeiros for depreciation, in accordance with the model established by the Board of Directors, it will be seen that the institute's own income covered 40 percent of the operational expenditures for the year 1984.

The balance statement also contains figures pertaining to Paulipetro, and with those figures deducted, we have the following:

	Millions of Cruzeiros	
	<u>1983</u>	<u>1984</u>
Current assets--accounts receivable	2,824	6,193
Current liabilities--suppliers	1,409	4,136

The economic situation of the IPT is expressed below in the index of current liquidity (current assets in relation to current liabilities) and the index of indebtedness (total owed in relation to net assets). To allow a better assessment of the accounts, these indices are also shown in terms of the adjusted figures, which exclude the sums pertaining to Paulipetro.

	<u>1983</u>	<u>1984</u>
Current Liquidity Index		
--with total figures	0.61	0.47
--with adjusted figures	0.40	0.39
Index of Indebtedness		
--with total figures	3.37	1.55
--with adjusted figures	2.72	1.10

BALANCE STATEMENT AS OF 31 DECEMBER 1984 AND 1983
 (in thousands of cruzeiros)

	Assets	
	<u>1984</u>	<u>1983</u>
Current		
Cash bank funds	1,488,568	931,636
Accounts receivable	12,577,816	11,524,828
Special and compulsory deposits	179,251	84,222
Stocks	588,159	165,370
Advance payments	2,659	8,290
	<u>14,836,453</u>	<u>12,714,346</u>
Long-term		
Special and compulsory deposits	454,689	152,572
	<u>454,689</u>	<u>152,572</u>
Permanent		
Investments	103,581	30,186
Fixed	100,034,705	32,259,433
	<u>100,138,286</u>	<u>32,289,619</u>
	<u>115,429,428</u>	<u>45,156,537</u>
	Liabilities	
	<u>1984</u>	<u>1983</u>
Current		
Suppliers	7,918,458	8,101,848
Loans and financing	6,402,775	2,290,944
Wages and contributions	5,245,044	4,076,111
Provision for general expenditures	2,744,920	1,465,458
Customers' advance payments	2,062,294	666,862
Provisions for wages and taxes	4,973,933	1,791,598
Provisions for interest and correction on loans	1,358,693	1,744,400
Other accounts payable	547,758	389,585
	<u>31,253,875</u>	<u>20,526,806</u>
Long-term		
Loans and financing	38,526,246	14,083,198
Other accounts payable	519,359	228,915
	<u>39,045,605</u>	<u>14,312,113</u>
Net assets		
Capital	35,504,600	13,516,947
Capital reserves	78,736,471	21,895,779
Cumulative losses	(91,451,626)	(25,918,094)
	<u>22,789,445</u>	<u>9,494,632</u>
State allocation for increasing capital	22,340,503	822,986
	<u>45,129,948</u>	<u>10,317,618</u>
	<u>115,429,428</u>	<u>45,156,537</u>

Appended explanatory notes are an integral part of the financial statements.

**Statement of Changes in Liquid Assets as of the Fiscal Years
Ending 31 December 1984 and 1983 (in thousands of cruzeiros)**

	Capital Reserves				
	<u>Capital</u>	<u>Monetary Adjustment on Capital</u>	<u>Allocation for Investment</u>	<u>Special Monetary Correction</u>	<u>Total</u>
31 Dec 1982 balance	6,127,816	5,990,771	16,786	268,158	6,275,715
Increase in capital	7,389,131	(5,990,770)	--	--	(5,990,770)
State allocation for future increase in capital	--	--	--	--	--
Compensation for cumulative losses	--	--	--	--	--
Monetary correction on net assets	--	21,164,667	26,285	419,882	21,610,834
Losses for the period	--	--	--	--	--
31 Dec 1983 balance	13,516,947	21,164,668	43,071	688,040	21,895,779
Increase in capital	21,987,653	(21,164,667)	--	--	(21,164,667)
State allocation for future increase in capital	--	--	--	--	--
Monetary correction on net assets		76,431,482	92,719	1,481,158	78,005,359
Losses for the period	--	--	--	--	--
31 Dec 1984 balance	<u>35,504,600</u>	<u>76,431,483</u>	<u>135,790</u>	<u>2,169,198</u>	<u>78,736,471</u>

	Adjusted Net Assets of the Self- Governing Body				<u>Cumulative Losses</u>	<u>State Allocation</u>	<u>Total</u>
31 Dec 1982 balance		368,184		(6,355,217)		1,398,361	7,834,859
Increase in capital		--		--		(1,398,361)	--
State allocation for future increase in capital		--		--		509,329	509,329
Compensation for cumulative losses		(704,985)		704,985		--	--
Monetary correction on net assets		316,801		(9,673,936)		313,657	12,567,356
Losses for the period		--		(10,593,926)		--	(10,593,926)
31 Dec 1983 balance		--		(25,918,094)		(822,986)	10,317,618
Increase in capital		--		--		(822,986)	--
State allocation for future increase in capital		--		--		18,044,220	18,044,220
Monetary correction on net assets		--		(55,794,422)		4,296,283	26,507,220
Losses for the period		--		(9,739,110)		--	(9,739,110)
31 Dec 1984 balance		--		<u>(91,451,626)</u>		<u>22,340,503</u>	<u>45,129,948</u>

Appended explanatory notes are an integral part of the financial statements.

Explanatory Notes for the 31 December 1984 Financial Statements

Note 1--Summary of the Main Accounting Practices

The financial statements are drafted and presented in accordance with the provisions set forth in Law No 6404/76 and the tax legislation in effect.

The effects of inflation on the financial statements are incorporated by means of the monetary correction shown on the records of the permanent and net assets, in which the state allocation for a future increase in capital is included, such that the net result of these corrections is incorporated in the results for the period.

The other assets and liabilities requiring correction or adjustment because of exchange variations are also corrected, and in the same way, the respective results are integrally incorporated in the statement of the results for the period.

The provision for uncollectible debts was established on the basis of an individual analysis of the credit sums owed, and is regarded as adequate to cover possible losses.

Stocks are shown at average purchase cost, which is lower than replacement cost.

Fixed assets are shown at corrected cost. Depreciation is calculated by the linear method, using the maximal rates allowed by the fiscal legislation, except for buildings, to which the rate of 2 percent per year is applied.

Note 2--Accounts Receivable

	1984 In Thousands of Cruzeiros	1983 In Thousands of Cruzeiros
Customers	10,182,878	9,960,509
Minus:		
Provision for uncollectible debts	384,804	230,216
Expected invoicing	<u>239,635</u>	<u>88,665</u>
Receipts to be billed	9,558,439	9,641,628
Subsidy from state government	2,473,324	1,192,523
Other accounts receivable	<u>546,053</u>	<u>399,650</u>
	<u>12,577,816</u>	<u>11,524,828</u>

Note 3--Fixed Assets

(in thousands of cruzeiros)

	<u>Corrected Cost</u>	<u>Cumulative Depreciation</u>		<u>Net</u>	
	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>
(1)	25,384,872	8,051,735	--	--	25,384,872
(2)	37,796,715	11,056,326	4,641,355	1,236,307	33,155,360
(3)	42,625,641	11,756,775	23,124,359	5,987,947	19,501,282
(4)	7,119,130	1,113,699	2,326,028	535,211	4,793,102
(5)	4,828,781	1,489,900	2,941,377	784,542	1,887,404
(6)	1,228,258	763,851	--	--	1,228,258
(7)	<u>16,532,567</u>	<u>7,221,133</u>	<u>2,448,140</u>	<u>649,979</u>	<u>14,084,427</u>
	<u>135,515,964</u>	<u>41,453,419</u>	<u>35,481,259</u>	<u>9,193,986</u>	<u>100,034,705</u>
					<u>32,259,433</u>

Key:

- | | |
|--------------------------------------|--------------------------|
| 1. Land | 4. Installations |
| 2. Structures | 5. Furnishings and tools |
| 3. Machinery, parts
and equipment | 6. Work in progress |
| | 7. Other |

Note 4--Loans and Financing

	<u>1984</u> <u>In Thousands of Cruzeiros</u>	<u>1983</u>	<u>Annual Obligations</u>	<u>Form of Amortization</u>	<u>Due Date</u>
Domestic					
BADESP*	6,746	9,199	4% + 40% ORTN**	Quarterly	1987
FINEP	1,733,623	750,267	2% to 12%***	Monthly and Quarterly	1996
Bank of Brazil	<u>110,366</u>	<u>78,098</u>	<u>18%</u>	Annual	1989
	<u>1,850,735</u>	<u>837,564</u>			
Foreign					
BID****/FINEP (\$4,894,200 in in 1984 and \$5,438,000 in 1983)	15,583,133	5,350,992	3%	Semiannual	1993
BID-FINEP- CEFER (\$2,547,412 in 1984 and \$2,751,205 in 1983)	8,110,961	2,707,186	8.6%	Semiannual	1997

	<u>1984</u> <u>In Thousands of Cruzeiros</u>	<u>1983</u>	<u>Annual Obligations</u>	<u>Form of Amortization</u>	<u>Due Date</u>
BANESPA (\$1,336,000)	4,253,824	1,968,000	libor + 1.75%	Semiannual	1988
BANESPA (\$416,000)	--	409,344	libor + 2.25%	One time	1984
BANESPA (\$4,752,000)	<u>15,130,368</u> <u>43,078,286</u> <u>44,929,021</u>	<u>5,101,056</u> <u>15,536,578</u> <u>16,374,142</u>	libor + 2.25%	Semiannual	1990

- * Sao Paulo State Development Bank
- ** National Treasury Readjustable Bonds
- *** Monetary correction = 10 percent to 60 percent of the ORTN
- **** Inter-American Development Bank

	Domestic		Foreign		Total	
	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>	<u>1984</u>	<u>1983</u>
Short-term	214,375	67,505	6,188,400	2,223,439	6,402,775	2,290,944
Long-Term	<u>1,636,360</u> <u>1,850,735</u>	<u>770,059</u> <u>837,564</u>	<u>36,889,886</u> <u>43,078,286</u>	<u>13,313,139</u> <u>15,536,578</u>	<u>38,526,246</u> <u>44,929,021</u>	<u>14,083,198</u> <u>16,374,142</u>

The loans and financing are guaranteed by the Sao Paulo State Treasury.

Note 5--Capital

The capital is distributed in 35,504,600,207 registered ordinary stocks (13,516,947,031 in 1983) with a nominal value of one cruzeiro each, of which 35,504,392,496 belong to the State Treasury (13,516,866,314 in 1983).

Note 6--Nonoperational-Financial Expenditures (Income)

These are presented in this accounting section because they are not factors included in the price of services rendered, but result from loans which will be paid out of specific future capital contributions.

Note 7--CESP-IPT Consortium Operations

In accordance with the agreement signed with the CESP on 7 December 1979, the CESP-IPT Consortium was established with a view to the provision of oil field prospecting, assessment and development services.

The operations of the consortium involving the direct participation of the IPT are shown in its financial statements. The expenditures resulting from these operations are reimbursed by the government of the state of Sao Paulo through the Secretariat of State for Industry, Commerce, Science and Technology.

On 5 May 1983, the operational activities of the consortium were halted. It is now engaged in negotiations with the suppliers and other creditors with a view to the settlement of accounts.

Sao Paulo, 20 February 1985

Engineer Alberto Pereira Castro, superintending director; Engineer Carlos Sousa Pinto, director; Engineer Paulo Cesar Leone, director; and Jose Roberto Pissiguelli, accountant (CRC 116,193-SP).

**Statement of Account for the Periods Ending
31 December 1984 and 1983
(in thousands of cruzeiros)**

	<u>1984</u>	<u>1983</u>
Gross operational income		
Services rendered	27,641,862	17,547,193
Product sales	3,359,232	1,149,407
Services rendered--SICCT	5,604,961	1,760,881
Other	<u>2,609,032</u>	<u>1,161,060</u>
	39,215,087	21,618,541
Less returns and discounts	271.710	49,607
Net operational income	<u>38,943,377</u>	<u>21,568,934</u>
Direct cost of services rendered and products sold	<u>49,357,746</u>	<u>25,436,373</u>
Operational margin	<u>(10,414,369)</u>	<u>(3,867,439)</u>
Operational Expenditures		
Personnel	20,547,635	7,595,373
Services of third parties	950,204	319,628
Depreciation (deductions of 3,305,681 cruzeiros in 1984 and 850,273 cruzeiros in 1983, on approximate cost)	634,221	318,836
Materials and supplies	1,112,564	393,437
Other	<u>3,093,242</u>	<u>1,043,177</u>
	<u>26,337,866</u>	<u>9,670,451</u>
Other income		
Budget economic allocations	<u>29,823,883</u>	<u>10,767,731</u>
Operational losses	<u>(6,928,352)</u>	<u>(2,770,159)</u>
Nonoperational financial expenditures		
(deductions of 21,604,424 cruzeiros in 1984 and 354,983 cruzeiros in 1983 from income)	(45,956,157)	(15,156,009)
Other	--	(26,994)
Monetary correction on permanent and net assets	<u>43,145,399</u>	<u>7,359,236</u>
Net losses for the period	<u>(9,739,110)</u>	<u>(10,593,926)</u>
Losses per share of company capital (calculated on the basis of the number of shares at the end of the period)	<u>0.03 cruz.</u>	<u>0.08 cruz.</u>

Appended explanatory notes are an integral part of the financial statements.

**Statement of Origin and Use of Resources for the Periods
Ending on 31 December 1984 and 1983
(in thousands of cruzeiros)**

	<u>1984</u>	<u>1983</u>
Origin of resources		
From shareholders		
State allocation for future increase in capital	18,044,220	509,329
From third parties		
Long-term financing and loans	296,030	559,001
Other	<u>6,582</u>	<u>20,973</u>
Total	<u>18,346,832</u>	<u>1,089,303</u>
Use of resources		
In operations		
Net losses for the period	9,739,110	10,593,926
Less charges not representing resources paid out:		
Depreciation of fixed assets	3,939,902	1,169,109
Exchange variations and monetary corrections on long-term debts	26,139,553	10,175,042
Plus income not representing resources acquired:		
Monetary correction on permanent and net assets	43,145,399	7,359,236
Other	<u>4,730</u>	<u>(3,724)</u>
	<u>22,809,784</u>	<u>6,605,287</u>
On permanent assets		
Purchase of fixed assets	<u>2,137,801</u>	<u>657,753</u>
For other purposes		
Liabilities transferred from long-term to current status	2,002,401	463,668
Increase in long-term prospects	<u>1,808</u>	<u>7,420</u>
	<u>2,004,209</u>	<u>471,088</u>
Total	<u>26,951,794</u>	<u>7,734,128</u>
Reduction in current capital	<u>8,604,962</u>	<u>6,644,825</u>

	<u>End 1984</u>	<u>End 1983</u>	<u>Beginning 1983</u>	<u>1984</u>	<u>1983</u>
Current assets	14,836,453	12,714,346	7,233,453	2,122,107	5,480,893
Current liabilities	<u>31,253,875</u>	<u>20,526,806</u>	<u>8,401,088</u>	<u>10,727,069</u>	<u>12,125,718</u>
Current capital	<u>16,417,422</u>	<u>7,812,460</u>	<u>1,167,635</u>	<u>8,604,962</u>	<u>6,644,825</u>

Appended explanatory notes are an integral part of the financial statements.

Opinion of the Supervisory Board

The members of the Supervisory Board of the Institute of Technological Research of the State of Sao Paulo, S.A. (IPT), pursuant to their legal and statutory authority, have examined the balance sheets, the pertinent

statements of results, the changes in net assets and the origin and use of resources, as well as the related explanatory notes, as of the close of 31 December 1984, set forth in accordance with generally accepted accounting principles. Based on this examination and an analysis of the monthly balance sheets, as well as the opinion of the independent auditors dated 20 February 1985, they believe that said statements adequately reflect the economic-financial-asset situation of the institute, in suitable condition for submission to and assessment by the shareholders.

Sao Paulo, 25 March 1985

Eduardo Pinheiro Gondim Vasconcelos
Luis Antonio Siqueira Reis Dias
Vilmar Evangelista Faria

Opinion of the Auditors

To the Directors of the Institute of Technological Research of the State of Sao Paulo, S. A. (IPT):

1. We have examined the balance statement of the Institute of Technological Research of the State of Sao Paulo, S. A. (IPT) struck as of 31 December 1984, and the related statements of results, the changes in net assets and the origin and use of the resources during the fiscal period ending on that date. Our examination was carried out in accordance with generally accepted auditing standards and, as a result, included verification of the accounting records and other auditing procedures we deemed necessary under the circumstances.
2. Earlier, we examined and issued our opinion on the financial statements for the fiscal period which ended on 31 December 1983, and these figures are submitted for purposes of comparison.
3. In our opinion, the financial statements to which the first paragraph refers adequately reflect the status of the assets and finances of the Institute of Technological Research of the State of Sao Paulo as of 31 December 1984, the results of its operations, the changes in its assets and the origin and use of its resources for the fiscal period ending on that date, based on generally accepted accounting principles applied in consistent fashion with regard to the preceding fiscal period.

Sao Paulo, 20 February 1985, Boucinhas, Campos and Claro, S.C. (CRC.SP-5,528),
Jose da Costa Boucinhas, accountant (CRC.SP-10).

5157
CSO: 5100/2127

BRAZIL

SARNEY ON FRG ACCORD, ARGENTINA'S NUCLEAR INTENTIONS

PY022156 Brasilia Domestic Service in Portuguese 1840 GMT 2 Jul 85

[Press conference by President Jose Sarney with foreign reporters at the Gloria Hotel in Rio de Janeiro--live]

[Excerpts] [Reporter] Mr President, the nuclear agreement between Brazil and the FRG was signed 10 years ago. The initial project foresaw the construction of eight nuclear plants by 1990. It now seems that none of those plants will be completed by that date. I would like to know the priority you will attach to that contract, specifically if your government will proceed with the construction of the second plant that is part of the contract with the FRG.

[Sarney] The Brazilian nuclear program and, within it, the part related to the contract with the FRG, is caught up in the difficulties that the country faces. Therefore, it will be subject to some strategy modifications.

At the same time, we are not in a position at this time to implement it. So it is included among those sectors in which we have to make quite substantial cuts.

[Pierre Guitaud, French television] The French Government has invited Brazil to participate in the Eureka project, and the same government praised the new Brazilian policy. At your invitation, President Mitterrand will visit Brazil. How would you like this visit to develop, basically from the political and economic standpoints?

[Sarney] The operation of the Eureka project is still a declaration of intent by some sectors of the French Government. We all know that the Eureka project is a peaceful response to the "star wars" initiative. We expect that the visit of President Mitterrand to Brazil will serve to bring our peoples closer together and, at the same time, will serve as an opportunity to discuss some problems of common interest between France and Brazil. One such area is the foreign debt problem, which we hope to clarify from the point of view of the European creditors, the Paris Club. It should also be an occasion to think over the problems of the world, Central America, world peace, and disarmament. Summing up, it should be an occasion to exchange opinions between two countries that want to state their mature position on international issues.

[Horacio Jimenez, ANSA] Mr President, through a parallel or secret nuclear program, Brazil could be developing technology to manufacture an atomic bomb, just like Argentina. Would this not be a case calling for serious talks between statesmen of the two countries to return to the peaceful use of nuclear energy, thus preventing enormous unproductive expenditures and new internal or external military adventures?

[Sarney] We do not believe that Argentina wants to manufacture the atomic bomb. We do not have any program to manufacture the atomic bomb either. Our interest in harnessing the technology of the atom is exclusively related to its peaceful uses. As we all know, Brazil is not a country rich in fossil fuels.

We need to have access to the technology of the atom so that we can be in a position to make our most industrialized regions independent of energy shortages in the short term. We are signatories of the Tlatelolco Treaty through which Brazil is committed to a nuclear-free Latin America. We do not want Latin America to be involved in any sort of nuclear weapons deployment. This is our position, and it will be maintained. Latin America has the privilege of being the only part of the planet that is free of nuclear arsenals. We wish it to stay free forever.

CSO: 5100/2156

BRAZIL

GOLDEMBERG CITES CAUSES, SOLUTIONS TO PROGRAM'S PROBLEMS

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 17 Jul 85 p 22

[Article by Jose Goldemberg: "The Agreement, 10 Years Later (1975-1985)"]

[Text] Launched 10 years ago as a project of great impact, capable of profoundly altering the course of Brazilian energy policy, as well as making us a great power, the nuclear program conducted by Nuclebras, based upon the agreement with West Germany, is now in ruins.

The Figueiredo government 4 years ago had already begun to lose interest in the program, initiating other activities of nuclear technology outside the Nuclebras program.

Now the Sarney government, in cutting funds for the Angra III (and other nuclear reactors), has given the coup de grace to a poorly formulated and poorly conducted program that led the scientific community--the only one that could have made it a success--to direct confrontation with the Geisel government since 1975, with negative consequences for the nation's scientific development.

Collapse of a program of such magnitude, which was to install eight 1200-megawatt nuclear reactors by 1990 and another 20 or 30 reactors in the 1990-2000 decade, is due mainly to the following reasons:

1. Incorrect evaluation of the role that nuclear energy should play in Brazil, which is amply endowed with hydroelectric resources, advantageous from all points of view: economic, technical and environmental. The forecasts that the nation would need eight large nuclear reactors in the year 1990 were clearly incorrect, as Itaipu (and other hydroelectric facilities) will supply the needed energy, at least until the end of this century. The success of Itaipu is probably the major economic reason for the collapse of the nuclear program, having diverted funds and prestige away from it.

2. Incorrect evaluation of the technology chosen for uranium enrichment, without which adoption of nuclear energy will only increase dependency on fuel imports. After 10 years and after spending about \$300 million, what was accomplished in the area of enrichment was a 24-stage pilot unit; should this pilot unit function satisfactorily--which seems unlikely--additional investments of about \$3 billion would be needed.

This is the main point raised by the scientists from the beginning against the nuclear agreement, as the technology chosen was already controversial in 1975. The government argued at the time that the Germans were forced by the Americans to abandon the initial offer of granting the (much superior) ultracentrifuge technology. This was and continues to be a fundamental question, and the Brazilian Government, for this reason, should have broken off negotiations with the FRG or created a domestic research group to develop its own technology--which in fact was done as of 1981.

3. Technical errors and unsatisfactory management that greatly increased the costs of the Angra dos Reis II power plant (the first of the plants bought from Germany). Total Nuclebras investments have been \$2.8 billion so far, plus a debt service of \$1.2 billion, for a total of \$4 billion, for which it has very little to show.

The main items for which these vast funds were spent are the following:

- Mineral exploration: \$150 million;
- Manufacture of uranium concentrate (at Poço de Caldas): \$260 million;
- Pilot enrichment plant: \$300 million;
- NUCLEP [Nuclebras Heavy Equipment, Inc] (heavy-equipment plant in Itaguaí): \$300 million;
- Nuclear fuel plant (Rezende): \$75 million;
- Technological training (for engineers): \$275 million.

The rest was spent in operating the company itself, which has about 5,200 employees, and on the expensive facilities of Angra II, the equipment for which has all been bought in Germany.

One of the items on this list that particularly catches the eye is the cost of technological training: throughout the 10 years of Nuclebras' life, a few hundred persons at the most were trained, which means that each one of these must have cost the public coffers almost \$1 million. This cost should be compared with what is spent on the National Council for Scientific and Technological Development [CNPq] to train the elite of the nation's researchers.

This is the result of 10 years of a grandiose project, that was characterized as such by the scientists of the SBPC [Brazilian Society for the Advancement of Science] at their 1975 meeting in Belo Horizonte.

According to its current president, Licinio Seabra, Nuclebras "lived in a world of fantasy (during these 10 years)."

How are we to leave this fantasy and try to solve the problems of the nuclear program created by Nuclebras?

One proposal discussed by President Tancredo Neves' COPAG [Committee for the Government Plan of Action] and that seems to have the support of the current Nuclebras management is a rapprochement with the electric sector (that is, ELETROBRAS [Brazilian Electric Power Companies, Inc.], with which Nuclebras tried to compete) and adoption of the French administrative model, which in Brazilian terms would be the following:

- Nuclebras would concentrate its efforts exclusively on the fuel cycle. The costs of installing the fuel cycle would be covered by a specific budget appropriation;
- The activities of nucleoelectric generation would remain in the electric sector, with an ELETROBRAS subsidiary being created for this specific and exclusive purpose. Angra I and II, as well as all the FURNAS [Furnas Power Companies, Inc] nuclear personnel, would be transferred to this company;
- NUCLEN [Nuclebras Engineering, Inc.] would become a subsidiary of the nucleoelectric generating company or else incorporated in it as a sector for co-ordinating engineering. The same thing could happen to NUCON [Nuclebras Nuclear Plant Construction, Inc], which, incidentally, is already in a process of liquidation.

The main disadvantage of this model is that of continuing to burden the finances of the electrical sector with the costs of facilities for nuclear generation.

Implementation of these ideas requires a policy decision, which so far has been made only implicitly through cutting Nuclebras funding.

Whenever speaking of revising the nuclear program and the nuclear agreement with the FRG, our government leaders always make ambiguous statements, such as those of President Tancredo Neves: "In regard to the commercial agreements resulting from the nuclear agreement, they will have to be examined and made compatible with the nation's economic capability." The Sarney government has in fact adapted the nuclear program to our economic circumstances, restricting it to construction of Angra II, but without reviewing the commercial agreements.

Tancredo Neves said further: "In reference to the specific agreement with the FRG, I think the most rational solution would be to retain it, making those revisions that our scientific and technical community is recommending to the government."

These recommendations are very clear and were summarized recently in a document published by the Brazilian Society of Physics:

1. Cancellation of the agreements to set up joint ventures between Nuclebras and the German companies headed by KWU.
2. Study the reorientation of the Nuclebras subsidiaries toward other productive activities.
3. Restructuring the sector of technological research and development in the nuclear area, strictly for peaceful purposes, meshing the CNEN [National Nuclear Energy Commission] and the research institutes with the universities, transferring CNEN and its institutes to the Ministry of Science and Technology.
4. Evaluate the nation's long-term nuclear-energy prospects, followed by establishment of a nuclear technology research and development plan, with the participation of various segments of society.

It is up to President Sarney to take a step forward in regard to what SEP!AN [Planning Secretariat] has done, ordering the restructuring of Nuclebras along the lines described above as a French managerial model.

This orientation would force renegotiation with the FRG authorities and the KWU (Siemens) group, inasmuch as the present subsidiaries of Nuclebras would have to be divided between Nuclebras and ELETROBRAS.

Experience shows that there is flexibility on the German side whenever it glimpses the possibility of continued purchases made in Germany and preservation of the diplomatic agreement that gave rise to the commercial agreements.

"The restructuring of technological research and development in the nuclear area, strictly for peaceful purposes" called for by the scientists can be achieved as part of this negotiation.

There would thus be ended 10 years of a bitter debate between government and scientists that was very educational for Brazilian society, because it prevented the errors that were committed in the nuclear area from being made in other important areas, such as informatics, computers, the aeronautical industry and others.

Collapse of the Nuclear Program from this point of view should be seen as a victory for the nation--and not just for its scientists.

8834
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BRAZIL

NUCLEBRAS HEAD SAYS PROGRAM'S FAILURE DUE TO LACK OF FUNDS

Uncertainty Marks Nuclear Program

Rio de Janeiro O GLOBO in Portuguese 27 Jun 85 p 23

[Text] "The world of fantasy has ended." That was the comment of the president of the Brazilian Nuclear Corporation (NUCLEBRAS), Licinio Seabra, on the Brazilian nuclear program, which is 10 years old today. In 1975, the Brazil-German program provided for the construction of eight atomic plants by 1990 to generate electric energy in the Southeastern Region. The then president of NUCLEBRAS, Ambassador Paulo Nogueira Batista supported the construction of 40 plants by the end of the century.

In these 10 years, Brazil spent \$4 billion on the program and has a foreign debt of \$2 billion. The first plant, Angra-II, has not yet been completed and Angra-III is on its foundations, \$2 billion more being needed to complete it. On the date of its anniversary, the Brazilian nuclear program is uncertain. The government of the New Republic wants a plan for the turn of the century and is seeking to reconcile the shortage of funds with a pace of work that will make it possible to absorb the technology. The minister of mines and energy, Aureliano Chaves, admits that it will be necessary to renegotiate the agreement with the Germans.

The failure of the program is attributed by the president of NUCLEBRAS to the lack of definite financial support. Licinio Seabra believes that to carry forward the minimum program a sure source of funds that does not depend so much on German marks is essential.

"As it is, it is not viable, not realistic," he said.

Despite saying that it will be up to the Ministry of Mines and Energy and the Brazilian Electric Power Stations Corporation (ELETROBRAS) to decide the number of nuclear power stations to be built in the country, Licinio Seabra supports the construction of another plant to go into operation 2 years after the completion of Angra-II and III scheduled for 1991 and 1993. According to him, the plant, which should be begun next year at a still undetermined site, is necessary to preserve the engineering team and guarantee the process of absorption of technology.

Of the \$4 billion already spent, \$2.8 billion was invested in the first two plants and in the fuel cycle project. The remaining \$1.2 billion pertain to the financial charges (interest and amortization.)

Licinio considers that in the past 10 years technology was absorbed in various phases of the cycle, as in the conversion of uranium concentrate, enrichment, reprocessing, mining, construction of heavy components and power plant engineering.

The fuel cycle projects already completed are the heavy components factory, NUCLEP, which costs \$350 million; the plant for the production of uranium concentrate (yellow cake) in association with the French Pechiney Company; and the assembly part of the fuel elements factory. The demonstration plant of uranium enrichment by the jet-nozzle process developed jointly with Germany will be completed by the end of next year (it costs \$300 million.) The construction of the industrial unit with a capacity to enrich uranium for three nuclear plants will cost \$1 billion.

Seabra admitted that the creation of an ELETROBRAS subsidiary to build nuclear power plants and the privatization of NUCLEP are being studied. NUCLEBRAS would remain in charge of only the fuel cycle.

NUCLEBRAS Could Be Closed

Sao Paulo O ESTADO DE SAO PAULO ir. Portuguese 28 Jun 85 p 3

[Editorial article: "In the World of Fantasy"]

[Text] NUCLEBRAS, which lived 10 years in the "world of fantasy", could be closed, its plant construction functions being transferred to ELETROBRAS while another small company would be in charge of the work connected with the enrichment of uranium. It would thus be possible to achieve considerable savings in a company that today has six subsidiaries, employs 5,200 persons with a payroll of \$3.5 million a month and owes so much that it can only buy material, even the most simple material for daily use, by paying cash.

That is the picture of NUCLEBRAS drawn by its president, Engineer Licinio Seabra, who proposes its deactivation after 10 years' existence of the nuclear agreement signed with Germany, a period in which it lived in a "veritable fantasy world." NUCLEBRAS has already invested \$2.8 billion but has a service of about \$1.2 billion on the debt contracted in that country. NUCLEP's (one of its subsidiaries) equipment factory alone--imported to build nuclear reactors in Brazil when they were being deactivated throughout the world (including this one that was transferred here...)--cost \$300 million and is practically at a standstill. Inside it, NUCLEBRAS stocks electronic equipment shipped by Germany for nuclear plants II and III valued at \$3 billion, which Brazil received unwillingly because there is no prospect that it will be utilized.

A reading of Licinio Seabra's interview is cause for amazement and despair at important aspects of the disastrous results of the closed decisions by the military techno-bureaucracy, dominant in the last 21 years. First, the boldness with which public funds were committed, which, if the plan had gone ahead would have reached about \$40 billion to generate unnecessary energy. Alongside that, one notes clearly in this case how the state machinery operates. Once the agreement with West Germany was signed, providing for the installation of eight plants, companies began to be created one after another--today six in number--with very expensive structures. Thus, 5,200 persons were employed the only production of which was bureaucracy, as our report from Rio said yesterday. Only the economic crisis through which the country passed--already perfectly foreseen in 1975 when the nuclear agreement was signed inasmuch as we were going toward the situation of the oil price explosion--prevented another similar series of companies from emerging and other thousands of employees from being contracted.

That is the way the state machine works in its zeal to generate development to sustain itself.

After 10 years, the fantasy has ended. Fortunately, a single voice remains in this New Republic, that of Licinio Seabra, preaching a belated conservation, which must begin with the closure of the company. Obviously, the transfer of its functions to ELETROBRAS, of which it would become only a department, should imply the draining of its staffs and expenses. There would be little point in merely swelling the electric energy holding company even further; it is already facing financial difficulties to carry out the minimum projects necessary for the domestic supply. Implicit in the proposal of the president of NUCLEBRAS is that it is not viable--like the nuclear program originally approved by General Geisel--and no longer has reason to exist, just as the nuclear plants were not justified.

When we read that interview, we could not fail to ask if that is not the situation of a large number of the 422 state companies registered by the Special Secretariat of State Enterprises (SEST); actually, there are more than 500 in the federal area alone. How much could be saved by simply privatizing them or abolishing them, as Licinio Seabra proposes for the NUCLEP equipment factory, which competes with private industry? How much more, today a burden to the state, could be transferred to private hands?

In this order of reasoning, there is the satisfaction to see finally someone who belongs to the government staffs have the courage to make these exposures.

8711
CSO: 5100/2131

BRAZIL

NUCLEBRAS TECHNICIANS DOUBT ANGRA III WILL BE HALTED

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 18 Jun 85 p 26

[Text] Brazilian Nuclear Corporation (NUCLEBRAS) experts declared in Rio yesterday that the complete suspension of the Angra-III nuclear plant project could represent losses to the country of approximately \$1 billion already invested in works and equipment and another \$900 million committed to commercial contracts with KWU. They do not believe that measure will be taken by the government and argue that there are other projects to be cut in the company's timetable.

The Angra-III project is still in the beginning stage; thus far, only the ground-leveling work and preparation of the project bed have been completed. Since the civil works have not yet begun, it may appear that it is easy to deactivate the project but, the experts ask: "What to do with the equipment stored in Itaguaí, formerly stored in the port of Hamburg, Germany, and which cannot remain very long subject to the action of rust and sea air?"

The NUCLEBRAS experts warn that the manufacturer's guarantee period is 5 years and 70 percent of the Angra-III equipment is already stored in the Nuclebras Heavy Equipment Corporation (NUCLEP) in Itaguaí awaiting assembly. The Brazilian Government must decide either to continue the civil works and make up the delay to put that plant into operation by the year 1992 or renegotiate with KWU to see if it will accept that equipment back.

In the opinion of the experts, what would be absurd would be to stop construction of Angra-III and let the equipment deteriorate through the action of time. There is very sophisticated electronic equipment, many turbines with very heavy shafts that can warp by being subjected for a long time to the force of inertia and must be submitted to periodic tests in maintenance plants. Because of a lack of funds, none of this is being done and the two plants, Angra-II and Angra-III, run the risk of giving as much trouble as is presently occurring with the Angra-I plant, if they go into operation.

Obviously, say the experts, it is not in the interest of KWU to expose itself to such safety and reliability risks because it has a market and a reputation to protect and it is already looking with misgivings at the headaches that the U.S. Westinghouse Company has been having with Angra-I.

Manifesto

In commemoration of the 10th anniversary of the Brazil-Germany nuclear agreement, the union of engineers of the state of Sao Paulo, of Rio Grande do Sul, the Regional Economic Council of Rio de Janeiro and the Association of Peace Studies yesterday released a manifesto that, in addition to condemning the errors committed calls for a reevaluation of the country's energy policy, asking also that the authorities of the New Republic fulfill the commitments assumed to adapt the nuclear agreement to the real needs of the country in terms of energy and technology without taking into consideration nepotism and other lesser interests.

In the opinion of the former director of the Nuclebras Engineering Corporation (NUCLEN), Joaquim de Carvalho, Brazil will not need nuclear energy until the first decade of the next century.

8711
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BRAZIL

CHAVES DEFENDS ANGRA III CONSTRUCTION; EDITORIAL COMMENT

Ministry Cites Infrastructure

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 21 Jul 85 p 38

[Text] Brasilia--The Mines and Energy Ministry wants to retain--even if at a slower pace--the plan for constructing the Angra III nuclear power plant, which is included on the blacklist of government cuts. Mines and Energy Minister Aureliano Chaves has taken a position in support of Angra III with the argument that the plant is needed to keep the nation's infrastructure functioning until the years after 1990, when nuclear energy will become a necessity.

Forty percent of the equipment for Angra III, the second power plant of the Brazil-West Germany agreement, is either ready or on order and its foundations are finished. Investments of 46.8 billion cruzeiros are planned for this year, to build the construction shops and offices. If the project is interrupted, 40 billion cruzeiros must be spent for penalties and other personnel costs in deactivating the job.

It was 10 years ago, on 27 June 1975, that Brazil signed the treaty with West Germany. The intention was to construct eight nuclear power plants by 1990, with investments of \$18 billion, including \$13.8 billion for the power plants, \$3.7 billion for the fuel-cycle units and \$900 million for investment in technology. The first plant under this agreement, Angra II, is not likely to begin operation until 1991.

What actually happened was a complete revision of the initial grandiose plans, which further called for building 35 more nuclear plants by the year 2000 and the transformation of Brazil into a Third-World nuclear power, an exporter of power plants and enriched uranium.

So far, Brazil's nuclear program--which began in 1971 when the U.S. firm of Westinghouse was hired to build the first plant, Angra I--has consumed \$5.8 billion, including \$1.8 billion for Angra I, which is among the plants generating the world's most expensive energy--\$2,875 per kilowatt--and the remaining \$4 billion for the FRG program. Angra I did not enter operation until 14 years after it was begun, and even so it still depends upon investments of \$300 million to operate with the necessary reliability.

Revision

The mines and energy minister intends to make a complete reevaluation, with the Germans, of the nation's nuclear-energy program, renegotiating its clauses that are now entirely obsolete in regard to power-plant construction and cutting corners in the technological area.

The greatest progress so far has been in this latter area: Brazil now produces uranium concentrate (yellow cake) and uranium hexafluoride (gas); it is beginning to test the "jet-nozzle" enrichment process this year; it produces fuel elements, 80 percent of engineering services and almost 100 percent of all heavy equipment for a nuclear power plant.

In this renegotiation, the minister is likely to propose cancellation of the two nuclear plants, Iguape I and II, that were contemplated to follow. The decision to build these plants will be made by President Sarney's successor, depending upon market conditions for electrical energy.

Aureliano also intends to completely revise the structure of Nuclebras, which will lose its Brazilian subsidiaries and become a department of ELETROBRAS [Brazilian Electric Power Companies, Inc], responsible for building nuclear plants. The only thing kept will be a nuclear technology enterprise in charge of developing the fuel cycle and specific process engineering.

With this liquidation, the government will take over the charges on a \$2 billion debt and a domestic debt to banks and suppliers of about 400 billion cruzeiros. ELETROBRAS would become responsible for building Agra II by 1991 and Agra III, which according to what has been arranged, may be delayed by as much as 3 years, until 1994. To conclude both plants, another \$1.9 billion will be needed, including \$900 million for Angra II and \$1 billion for Angra III. So far, \$900 million has been spent on the first and \$300 million on the second plant.

Doubts Expressed About Program

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 21 Jul 85 p 3

[Editorial: "Defending the Indefensible"]

[Text] There is a resurgence of an old idea for justifying unjustifiable projects: it is better to complete them, because to halt them at the current stage would be more expensive. This was used by the technocrats to go ahead with building USIMINAS [Minas Gerais Iron and Steel Mills, Inc.] and the Steel Railway and now, albeit timidly, is being advanced to force construction of the Angra III nuclear power plant. An argument (false, of course) often used is that a large part of the equipment for this plant has already been bought and is being stored in NUCLEP [Nuclebras Heavy Equipment, Inc], in Rio de Janeiro; the respective computer is already on its way to Brazil, unless we want to suspend the shipment and pay for storing it in Germany. To stop now would cause greater damage than to continue...

Now, we all know that this is not the truth. Brazil bought 40 percent of the equipment earmarked for Angra III, which was delivered immediately by the German

suppliers simply because it was already practically ready, standing idle due to cancellation of nuclear power plants planned for that country. But this, after all, does not mean so much if we recall that to build this additional plant we will spend at least \$3 billion--an optimistic estimate. It is argued that conclusion of the work that has begun would cost the country no more than \$1 billion, which is not true, if only because financing costs must be added.

Moreover, Nuclebras has not yet signed a contract for constructing Angra III. It has committed itself with the contracting firm--very interested in defending the idea that it is cheaper to go ahead than to stop----only in regard to land preparation. Only this. There is thus no future penalty for contract violations that could make it more expensive to quit, as occurs in other projects.

Lastly, we insist that it is not true that it would be possible to conclude Angra III with \$1 billion. It would cost at least \$2 billion more than that, if not more! And, as if arguments showing the advisability of postponing it indefinitely were not enough, there is this decisive point: there isn't enough money to carry out ELETROBRAS' most urgent projects, the indispensable minimum to meet growing demand and also to strengthen the transmission and distribution systems. We may even have some difficult times unless there is a perfect and rational application of the already limited funds. How is it possible to begin simultaneously construction of two--note: two, not one!--nuclear power plants whose price represents at least twice that of any hydroelectric plant, and this in a country that still has an immense potential to tap?

Nothing, absolutely nothing--except injured vanity or jeopardized interests--justifies the idea that is now being raised to the effect that it is more economical to build Angra III than to quit. This is the position of contractors and bureaucrats. In fact, it is indeed symptomatic that this idea appeared in the press after Mr Aureliano Chaves visited the construction sites of the nuclear program (including the aberrant NUCLEP, a nearly idle plant for building atomic reactors!) and had conversed with the father of the FRG agreement, Gen Ernesto Geisel. He left there contradicting what he had said before, especially when he was chairman of the National Energy Commission: after all, Brazil needs nuclear energy! Only he did not say when, at what cost and for what.

The mines and energy minister knows that the president of the republic decided on creation of a high-level commission, with representatives of all sectors, including independent members of the government, to render an opinion about the nuclear program and the agreement with West Germany. He must therefore take steps for this commission to be set up and to be given free access to all documents, many of them still secret. Meanwhile, everything remains as it is--that is, the most that will be done is to finish Angra II. And that is already too much for a country that still has 200 million kilowatts in its rivers waiting to be tapped.

Mr Aureliano Chaves should really be thinking about an arrangement to replace any equipment purchased in Germany with other equipment of greater use at this time. Or else freeze everything, as Brazil cannot spend \$2 billion just to justify unwise purchases in the past.

BRAZIL

AMENDMENT BANNING PRODUCTION OF WEAPONS TO BE PROPOSED

Sao Paulo FOLHA DE SAO PAULO in Portuguese 17 Jun 85 p 4

[Text] Brasilia--Impressed by the support he received for proposed constitutional amendment declaring that Brazil will not build an atomic bomb, Deputy Helio Duque (Brazilian Democratic Movement Party--Parana) announced yesterday that he will be in a position to present the proposal for legislative consideration at the end of next week.

"It is a tribute to the Brazilian Armed Forces," he emphasized, "which have always declared themselves to be peace-loving and supporters of peaceful coexistence with our neighbors as well as a tribute to the Brazilian Government, whose anti-war intentions reflect the sentiment of our people."

The constitutional amendment bill already has more than 200 deputies' signatures, which would be enough to guarantee its consideration, which requires only the support of one-third of the members of the Senate (23 senators.)

Military Reaction

Helio Duque was with President Jose Sarney the day before yesterday and, according to him, before going into his office he was called discreetly by an officer interested in the bill and in exchanging ideas on the subject.

The proposal consists in adding another paragraph to Article 7 of the constitution which presently has a single paragraph stating that Brazil will not engage in a war of conquest. The Parana deputy believes it is a matter of adding that Brazil will not build nuclear devices for military purposes, nor purchase or permit the transit of atomic weapons through its territory.

The deputy points out also that the Brazilian Government is a signatory of the Tlatelolco Agreement on the denuclearization of Latin America, which reflects the measure of its peaceful purposes with regard to the utilization of atomic resources.

8711
CSQ: 5100/2131

21 August 1985

BRAZIL

BRIEFS

NUCLEAR AGREEMENT REEXAMINATION--Mines and Energy Minister Aureliano Chaves yesterday announced that the Brazilian nuclear program and the construction of more than five nuclear plants, established in an agreement with the FRG, will be reviewed by a high-level commission made up of representatives of the government and the Brazilian scientific community. After meeting with President Jose Sarney at Planalto Palace, Aureliano Chaves reported that the nuclear program will be reexamined in view of the country's economic situation. The commission, to be established in the next few days, will be coordinated by the Mines and Energy Ministry and will have 120 days to make the study. According to the mines and energy minister, one point has already been decided: The investment in the nuclear program will be reduced but the Angra II and III nuclear plants must be concluded. [Text] [Rio de Janeiro O GLOBO in Portuguese 12 Jul 85 p 17 PY]

NUCLEAR PROGRAM REASSESSMENT--Mines and Energy Minister Aureliano Chaves has proposed to President Sarney that he form a commission to reassess the nuclear program within 120 days. Chaves advocates a slowdown in the work on the projects, while the Secretariat of Planning advocates a total halt. [Excerpt] [Sao Paulo Radio Bandeirantes Network in Portuguese 1000 GMT 24 Jul 85 PY]

JAPANESE-BRAZILIAN AGREEMENT--A scientific and technological cooperation agreement was ratified on 21 June between Brazil and Japan. The agreement entails training in the fields of computer science, micro-electronics, nuclear energy, biotechnology in food processing area, health, energy, and technology. [Summary] [Sao Paulo O ESTADO DE SAO PAULO in Portuguese 22 Jun 85 p 13]

NUCLEAR PROGRAM COMMISSION--Mines and Energy Minister Aureliano Chaves would like to institute a high-level commission with the participation of the scientific community, which will propose changes in the nuclear program. [Text] [Sao Paulo Radio Bandeirantes Network in Portuguese 1000 GMT 12 Jul 85]

CSO: S100/2142

CHILE

BRIEFS

'NO PLANS FOR ATOMIC BOMBS'--Santiago, 17 Jul (AFP)--National Energy Commission President Herman Brady today stated in Santiago that Chile has no plans to build atomic bombs. The country has not even begun research in the military use of nuclear energy, and it does not have any plans to do so in the future, stated Brady, whose post is ministerial level in the government. According to Brady, Chile seriously believes in the Tlatelolco Treaty, which bans the proliferation of nuclear weapons in Latin America. The Chilean support of that treaty is a political decision that will be maintained, Brady added. [Text] [Paris AFP in Spanish 2123 GMT 17 Jul 85 PY]

CSO: 5100/2145

EGYPT

BRIEFS

URANIUM, THORIUM IN AL-BUHAYRAH--Cairo, 4 Aug (MENA)--Egyptian experts working at the Nuclear Materials Organization have discovered uranium and thorium at (Abu Khashyah) village, one of the Markaz Rashid villages in Al-Buhayrah Governorate. The experts emphasize that these two substances exist in large enough quantities to allow economic extraction from black sands that cover a 6 by 2 kilometer area. Dr 'Ali al-Sukkari, chairman of the Soil Chemistry Department of the Nuclear Materials Organization told the Egyptian paper 'AL-MASA' that an Australian company has been entrusted with extracting nuclear matter from the black sand and will begin producing uranium in this region. The first phase of extraction, he said, will cost about 5 million pounds. This will involve building two factories. The first factory is to produce monazite, a substance used to extract uranium. The second is to produce zirconium, from which thorium is extracted. Al-Sukkari added that the organization will continue to explore for these substances in the area extending from west of Alexandria to Rafah in the northern Sinai. [Text] [Cairo MENA in Arabic 1525 GMT 4 Aug 85]

CSO: 5100/4611

INDIA

DECISION ON NONPROLIFERATION PACT EXPLAINED TO IAEA

Bombay THE TIMES OF INDIA in English 14 Jun 85 p 16

[Text]

VIENNA, June 13 (PTI).

INDIA has told the International Atomic Energy Agency (IAEA) that it opted to remain away from the nuclear-non-proliferation treaty when it became clear that the treaty was going to be discriminatory and ineffective.

The background of the decision was given to the agency's board of governors' meeting here by Indian governor on the board, ambassador, Mr. S. K. Singh, in the course of a 30-minute review of the agency's annual report, which summed up India's "overall thinking" on all issues concerning the agency.

Mr. Singh told the board that in recent months India had been subjected to fresh appeals by "some friends" that it should "accede to the non-proliferation treaty."

He said that when the non-proliferation treaty was being negotiated, India had proposed the inclusion into the text of an article providing for complete stoppage, by nuclear weapon states of their production of nuclear weapons and a cut-off in the production of fissionable materials for weapons purposes.

"If only this request of ours had been heeded then international safeguards could perhaps have been extended to all nuclear facilities in nuclear and non-nuclear weapons states", he said.

Mr. Singh further contended that nuclear weapons states were not even prepared to discuss the matter then. It was clear to the rest of the world then that the treaty was going to be both discriminatory and ineffective.

Since then, he added, nuclear arsenals had risen dangerously. Thus if the matter were to be considered today it would be necessary to reduce "their arsenals significantly".

EXCLUDED MATERIAL

Reviewing the ineffectiveness of the treaty, Mr. Singh said that although it claimed a large number of signatories, in practical effect 15 years after the treaty came into force, only 32 per cent of all nuclear power reactors, representing a similar share of nuclear power generating capacity, were covered by the non-proliferation treaty safeguards. This did not include "the vast quantities of nuclear material in facilities dedicated to the production of nuclear weapons in nuclear weapons states", he said.

Turning to IAEA membership, Mr. Singh said 35 out of the total 112 member states could be considered industrially and economically developed. But only 14 of these had significant nuclear activities. And only 18 had shown political will for engaging themselves in significant nuclear work. Eighteen others had desired to pursue the benefits of nuclear science for future generations. Just 12 countries had given high priority for exploiting the potentials of nuclear science and technology.

Mr. Singh said India's attitude to the NPT was based on the country's philosophy to the question of disarmament. It was neither a by-product of any ambition nor a response to any power far away or near to India.

He added these were the reasons why India did not agree to participate in the review of the treaty, which it chose to keep away from.

CSO: 5150/0036

INDIA

COMMENTARY VIEWS PAKISTAN'S NUCLEAR PROGRAM, INTENTIONS

BK191359 Delhi THE HINDUSTAN TIMES in English 15 Jul 85 p 8

[Editorial: "The Pak Bomb"]

[Text] The report by an American television correspondent that Pakistan has successfully tested in non-nuclear explosions U.S.-made Krypton electronic triggers used to set off nuclear bombs need not provoke a panicky Indian reaction since Prime Minister Rajiv Gandhi has stated on more than one occasion that New Delhi is fully alive to Islamabad's nuclear developments as also its dubious intentions. Nevertheless, the report attributed to U.S. intelligence sources, but neither confirmed nor denied by the U.S. Government, is of a piece with the formidable weight of the evidence earlier adduced by such informed persons as U.S. Senator Cranston and the U.S. Nuclear Control Institute that "the Pakistanis have been all over using legal and illegal means to get whatever they need to augment their nuclear weapons program."

That Pakistan has been using fair means and foul to smuggle out of the U.S. and other advanced European countries vital electronic components needed to achieve its nuclear ambitions was brought home not long ago when several Pakistanis in private capacity unsuccessfully tried surreptitiously to take out of these countries sophisticated devices in bits and pieces that could only be used to trigger an atomic explosion. If Islamabad has indeed succeeded in hood-winking U.S. security agencies to get what it was desperately looking for, it should be enough to cause alarm in Washington. But considering the manner in which the Reagan Administration has acted in the recent past to pamper the Zia regime, it looks as though nothing short of a full nuclear test by Pakistani scientists will make U.S. policy-makers realise the gravity of the situation. If Washington still doubts Pakistani duplicity in the matter of its nuclear intentions, it must surely be living in a fool's paradise.

The Pakistani 'Islamic' bomb poses a real danger not to the U.S. but to India, and it is our policy makers who should spell out appropriate counter-measures to meet the Pakistani threat. Merely hedging the issue or saying that India will react only after the Pakistani fait accompli has been proved may be too late to counter Zia's blackmail. When an Israeli general, who had earlier headed the Mossad intelligence outfit, was asked by an Indian correspondent some years ago what his country would do in the event of Pakistan acquiring a nuclear bomb and whether it was contemplating any pre-emptive attack on